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PERCEPTION AND SCIENTIFIC KNOWLEDGE: TOWARDS A REALIST EPISTEMOLOGY

A Thesis Submitted
In Partial Fulfilment of the Requirements
for the Degree of
DOCTOR OF PHILOSOPHY

By

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to the
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INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

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C E R T I F I C A T E

This is to certify that the thesis "PERCEPTION AND SCIENTIFIC KNOWLEDGE: TOWARDS A REALIST EPISTEMOLOGY" submitted by S.G. Kulkarni in partial fulfilment of the degree of Doctor of Philosophy to the Department of Humanities and Social Sciences, Indian Institute of Technology, Kanpur, is a record of bonafide research work carried out by him under my supervision and guidance. The results embodied in the thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

R S Misra
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July 1979

CERTIFICATE

This is to certify that Mr.S.G. Kulkarni has satisfactorily completed all the course requirements for the Ph.D. Programme in Philosophy. The courses include:

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H-Phi 755	Advanced Logic
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ACKNOWLEDGEMENT

The Fountain-head of all philosophical problems is the problem of the relation between Knowing and Being. A philosopher's solution to this problem determines, or rather constitutes, his World-View. In tradition, this problem is approached so as to arrive at certain fundamental categories which because of the abstraction involved in the process assume an aura of purity and permanence, and thus become the apples of the eyes of that "spectator of all times and existence" - the metaphysician whose eyes see only these apples, not even tree on which they grow, let alone the water and manure which the tree needs.

The story of Philosophy is the story of succession of certain well-defined modes of thought offered as solutions to this central problem. Each solution in its prime appeared to be a happy discovery only to expose itself to be a tragic invention. History, as Engels said "is the cruellest of all the godesses who drive their chariots on the heaps of the slain."* History of ideas in general and the history of philosophical ideas in particular are no exceptions to this great and grand truth.

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* Letter to Danielson, 24th February 1893.

Even today much of the philosophical discussion, in whatever garb, is centred on the problem of knowledge; and this fact belies the opinion of some thinkers that in recent times the philosophical centre of gravity has shifted from Knowledge to Value. However, here is an attempt to work out some rudiments of an answer to some aspects of this gigantic problem.

Needless to say, a work in a discipline like Epistemology which one of the renowned philosophers of science rightly characterises as "undisciplined"* is bound to contain some amount of looseness and lack of absolute clarity. But so long as one intends not to eschew attempts to grapple with substantial issues one is bound to overlook the demands for strict geometrical rigour and absolute clarity. The game of stalling discussions on substantial issues on the excuse of seeking absolute clarity and get bogged down in verbal debates has outlived its utility. Further, the demand for geometrical rigour itself arises out of certain conceptions of philosophy, viz. the metaphysical conception wherein the philosophical imagination flies from "self-evident truths" to startling conclusions (or, can we say "from preconceived notions to predetermined results"?); and piece-meal conception under whose shadow

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* Bunge, Mario. "Foundations of Physics, Springer-Verlag N.Y. Inc. 1967, p.4.

more often than not rigour is bought at the cost of substance. The thesis, even if it is nothing else, is a case against such conceptions of philosophy.

Hence, it is not altogether unexpected to find in this dissertation some amount of "dim magnificance" which as Macaulay once pointed out, "if ...admitted into a demonstration...is very much worse than absolute non-sense". If that "dim magnificance" is relievingly small, the credit goes to the scrupulous guidance of my supervisor, Dr. Ramashanker Misra. I am extremely grateful to him for his incessant help, undiminished encouragement and immense patience. I am also grateful to Dr.(Mrs.) Mohini Mullick for her perennial encouragement, generous help and valuable criticisms.

I would be guilty of a gross deriliction of duty if I do not acknowledge the help and cooperation of my friend V. Balaji. I thank him whole-heartedly for the interest and enthusiasm he has shown concerning my work.

I thank Shri K.K. Bajpai for the patience and efficiency he displayed in typing the thesis.

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Do not seek to be a philosopher without being a man; be nothing other than a man who thinks; do not think as a thinker would, i.e. do not think in a context which is torn out and isolated from real human existence; think as living, real being, as one who is exposed to the revitalising and refreshing waves of the ocean of the world; think in existence...

Ludwig Feuerbach

SYNOPSIS

PERCEPTION AND SCIENTIFIC KNOWLEDGE: TOWARDS A REALIST EPISTEMOLOGY

A thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy by S.G. Kulkarni, to the Department of Humanities and Social Sciences, Indian Institute of Technology, Kanpur.

In this dissertation our concern is with the problem of knowledge, or what Popper describes as "the problem of cosmology, the problem of understanding the world including ourselves and our knowledge as part of the world." In our attempt to advance a broad outline of a theory of knowledge, perceptual knowledge dealt with in Part I and scientific knowledge considered in Part II constitute the foci of our interest and the dynamic character of knowledge serves as the epistemological centre of gravity.

Since we purport to develop a realist epistemology and since non-realist schools are predominantly empiricist, empiricism occupies the bulk of our attention. The fundamental feature of the empiricist tradition in epistemology is its search for a theoretically neutral foundation upon which is erected the super-structure of empirical knowledge. The justification of empirical knowledge is sought to be provided in terms of the so-called theoretically neutral basies. In the context of ordinary perceptual knowledge

the search for a secure epistemological starting-point has led the empiricist thinkers to take recourse to 'immediately given' sense-impressions, or sense-data, or statements concerning them. In science, similarly, the search has consummated in the idea of pure observation, or observation statements or operational definitions. Consequently, the entities figuring in the so-called super-structure of knowledge are supposed to acquire a secondary, parasitic and unsubstantive reality through a process of epistemological rehabilitation.

In our view this architectonic picture of knowledge is wholly unsatisfactory. In its search for certainty it not only mis-portrays knowledge but inveitably leads to irresolvable controversies which have infested the history of epistemology all along. And, specially in view of the challenge posed by Scepticism which it actually fosters, it lands itself into 'a crisis of integrity' which can finally be traced to a basic mis-conception of knowledge. Due to the failure in providing a justification of knowledge, necessitated by the very nature of the empiricist conception of knowledge, the ontological entities figuring in the so-called super-structure of knowledge fail to acquire even a dependent or parasitic reality.

In opposition to the empiricist and other non-realist schools with empiricist bias, we argue in support of

a realist conception of knowledge. In our view, it is neither necessary nor possible to find any preferred candidates for providing the basis; and therefore the entities that figure in the so-called super-structure have an autonomous and substantive reality. The major contentions of the view advanced in the dissertation are:

(a) that knowledge is theory-laden through and through;

(b) that knowledge is purposive in character;

(c) that knowledge is socially determined;

(d) that the objectivity of knowledge is to be traced on the one hand, to the inter-subjectivity or publicly shared theoretical framework and on the other hand, to the roots of knowledge in praxis; and

(e) that the growth of knowledge is adaptive and dialectical rather than cumulative in character.

Chapter 1, the 'Introduction' of the thesis exposes the broad lay-out of the thesis. It contains a general discussion on important epistemological schools, classical and modern.

Part I which deals with perceptual knowledge contains Chapters 2, 3 and 4. Chapters 2 and 3 are devoted to a consideration of various non-realist theories of perception. Chapter 2 which deals with sense-datum theory concerns itself with its Ayerian version, whereas Chapter 3 examines other more recent non-realist theories, namely,

Evidential theory of Chisholm, Causal theories of Grice and Maxwell and Nelson Goodman's Pragmatic Analysis or Rational Reconstructionism. In Chapter 5 we attempt to provide what seems to be a correct account of perceptual knowledge. Our major contentions with regard to perceptual knowledge is that it is entirely theory-dependent. The theory-dependent character of perceptual knowledge reveals four noteworthy features. They are: (1) that to perceive is to perceive in relations; (2) that realism is necessarily true; (3) that perception is socially determined; (4) that the objectivity of perceptual knowledge is rooted in inter-subjectively shared theoretical framework; and (5) that the growth of perceptual knowledge is adaptive and dialectical in character. In explicating the relation between perceptual knowledge and perceptual experience, we have made use of Bruner's Learning Model.

Part II which is devoted to a consideration of scientific knowledge comprises chapters 5 and 6. In Chapter 5 certain important non-realist meta-scientific theories, namely, Descriptivism, Instrumentalism and Conventionalism are discussed and evaluated. In Chapter 6 analogous to the ideas about perceptual knowledge developed in Chapter 4 a meta-scientific view is outlined. Using Mary Hesse's Learning Model we have tried to show how observation and theory get related in the actual process of scientific activity.

Finally, in the concluding chapter we outline a general theory of knowledge based on our discussions in Chapters 4 and 6. The outline is supplemented by a general discussion of the relation between knowledge and praxis.

CHAPTER 1

INTRODUCTION

1.1 The Problem

To state in general terms, our concern in this dissertation is with the problem of knowledge, or what Popper characterizes as "the problem of cosmology, the problem of understanding the world including ourselves and our knowledge of the world as part of the world."[1] In its execution, however, the dissertation deals specifically with perception on the one hand and scientific knowledge on the other. It needs no arguing to say that 'knowledge' and 'perception' are intimately connected. Coupled with these is the notion of scientific knowledge. Whereas ordinary or commonsensical perception provides the vast store of our knowledge of the external world, scientific knowledge occupies a prestigious position in so far as Science is generally regarded as the most fertile source of systematic knowledge. Popper rightly observes that the general problem of knowledge "may be approached from two sides: (1) as the problem of ordinary commonsense knowledge, or (2) as the problem of scientific knowledge".[2] The purpose of the dissertation is to work out a broad outline of a realist theory of knowledge in general with perception and science as its foci of interest. Part I which consists

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1. The Logic of Scientific Discovery, Hutchinson & Co., 1959 p.15.

2. Ibid. p.18.

of Chapters 2, 3 and 4 is devoted to a consideration of perception, and Part II containing Chapters 5 and 6 deals with the nature of scientific knowledge. In the concluding chapter, that is, Chapter 7, **certain** important conclusions are drawn from our discussion in Part I and II. And, these conclusions are supplemented with a general discussion of the relation between knowledge and praxis. In our attempt to develop a realist conception of knowledge, the growing or dynamic character of knowledge acts as its epistemological centre of gravity. But more about it later.

1.2 Preliminaries

It seems obvious, at least to a layman, that it is by perception and by perception alone, i.e., seeing, smelling, touching, tasting and hearing, that we come to know of the existence and the nature of the world around us. To the commonsense or what in philosophy is generally referred to as naive realism, perception is hardly problematic. In its view in perceiving, we confront the external world directly and straightforwardly. In other words, we perceive the world as it actually is. However, to philosophers, at least to a great many of them, the trustworthiness of knowledge acquired through sense-perception has traditionally been suspect. Their accounts of sense-perception and perceptual knowledge strike a radical departure from the commonsense point of view. Thus, in the Theaetetus, Plato examines the candidacy of sense-perception along with that of true

judgement and true belief for the exalted status of knowledge and finds them all wanting in important respects. True knowledge, it is argued, is infallible and is of the real. But, senseperception is neither infallible, nor can it yield knowledge of what actually is real. Similarly, the reliability or validity of perceptual knowledge receives even more severe scrutiny from Descartes, and Locke, Berkeley and Hume - The British Empiricists, resulting eventually in questioning the very possibility of empirical knowledge.

Doubts regarding the efficacy of perception are not peculiar to the traditional epistemologists alone. They are shared by a great many philosophers of the twentieth century too. It is, however, not intended here to go into the details of the various views opposing the commonsense standpoint. The mainstay of the attack both from the traditional as well as the contemporary epistemologists has been what has now come to be known as the argument from deceptive perceptual experience such as illusion and hallucination on the one hand, and relativity of perception on the other. On the grounds of the possibility of erroneous sense-perception it is argued that material objects may appear different to different persons or even to the same person under different conditions, even though they themselves do not undergo any change. If what all appears in sense perception actually belongs to material objects then such objects would possess incompatible qualities at the same time; and this is plainly absurd. Therefore, our ordinary perceptual claims must be

thought to go beyond what is strictly warranted.

Evidently the main thrust of the argument from illusion is twofold. First, it plainly denies the central contention of naive realism that in sense-perception we directly confront material objects. Secondly, it postulates an epistemological dualism between the objects of external world and what it regards primary sensory elements variously characterized as 'idea', 'sensation', 'impression', the 'given', or 'sense-data'. Our immediate awareness is said to be confined to primary sensory elements. Thus, the point of the argument from illusion is not that we do not perceive material objects or that material objects are non-existent, but that it is wrong to think that in perception we directly apprehend material objects.

Consequently, since the evidence normally afforded to our perceptual claims is compatible with their falsity, they cannot have the sort of certainty they ordinarily are thought to possess. They stand in need of rational justification in terms of something which is non-inferrentially certain, that is, immune from any kind of doubts.

Two related questions arise, thus. What is the relation between primary sensory elements and material objects of the external world? Secondly, how can our perceptual claims acquire the desired rational assurance? Traditionally two kinds of solutions have been proposed: (i) the causal theory whose classical statement is found in the Representative theory, and (ii) sensationalism or

phenomenalism whose classical progenitors are Berkeley and Hume. According to the Representative theory, material objects though exist independent of sense-experience, they causally determine the content of sense-experience. The primary sensory elements which are supposed to be effects, represent (or resemble) material objects which are conceived as causes of sense-experience. Perception, in this scheme, therefore, consists in our awareness of primary sensory elements. Our knowledge of external world is "supported by a straight forward causal inference in which the existence of sense experiences of certain kinds provides good inductive grounds,"[1] for our beliefs about external world. But if perceiving is awareness of primary sensory elements, then it can provide no basis to our beliefs about the external world. And, if the legitimacy of the causal inference is sought by adding some new premise, the additional premise itself will need justification which cannot be furnished. The theory, it is claimed, in fact leads to scepticism. As against this view, phenomenalism denies the possibility of such inference. Material objects, in its view, are no more than "bundles of actual and possible sense-impressions or sensations." Beliefs about the external world are though said to be "based on inferences from occurrent sense experiences; but these inferences are construed as inferences to other possible sense-experience."[2] The belief that in

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1. Swartz, Robert J (ed) Introduction to Perceiving, Sensing and Knowing, Anchor Books; 1965, p.xviii.

2. Ibid, p.xix.

perception we are aware (or at least directly aware) of only sense-impressions, "ideas", 'sensations" or "given" - a belief which underlies both representative and phenomenalist theories, has had such a sway in the history of epistemology that even philosophers like Thomas Reid, who were otherwise strongly inclined to commonsense view, could not help falling in line with it. In the twentieth century, this tradition is represented by eminent philosophers like Russell, Moore, Price and others, in whose hands sensationalism acquires great sophistication. It is noteworthy that in spite of vital differences between the causal theories and sensationalist or phenomenalist theories, there is a total agreement amongst them with regard to the epistemological priority of sense-experience or sense-impressions. It is true that the representationalist account of perception denies the possibility of arriving at the knowledge of physical objects from sense experience alone. In its scheme such knowledge is possible only when sense-experience is coupled with the causal principle. But even then the epistemological priority of sense-experience over the knowledge of physical objects remains unaffected.

Corresponding to the empiricist theories of perception we find Inductivist- Descriptivist theory in the field of philosophy of science. The empiricist theory of scientific knowledge is inductivist in the sense that according to it scientific knowledge proceeds from pure observations and reaches a theory by an inductive leap which enables one to

go from particular facts to a general statement. The theory is descriptivist in the sense that in its view the aim of science is not to provide explanations since explanations tend to involve references to unobservable events and entities but only description of phenomena in the most economical manner. Theories are thus summaries of observation statements or heuristic devices to facilitate description of phenomena with utmost economy.

It is obvious that by lending priority to sense-experience over physical objects the empiricist theories of perception adopt a non-realist stance towards physical objects. In other words, physical objects referred to by our perceptual claims have no autonomous ontological status. That is to say, their reality is parasitic or nonsubstantive. Similarly the empiricist view of science, by conferring epistemological priority on observations or phenomena, commits itself to a non-realist approach towards theoretical entities of science. Thus, empiricist epistemology is essentially non-realist though this is not to say that all the non-realist epistemological views are empiricist.

It may be objected that the above characterisation of empiricism does not do justice to the Lockean position. It is true that Locke by committing himself to atomic hypothesis championed by Boyle and Newton did adopt a realist view in the field of philosophy of science.[1] It is owing

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1. cf. Mandelbaum, Maurice, Philosophy, Science and Sense-Perception, Johns Hopkins Univ. Press 1964, Chapt.1.

to this that Locke wielded a decisive influence on French materialism through Candillac, Helvetius and others.[1] But realism was adopted by Locke with some cost of consistency. At ontological level Locke adopts mechanistic materialism whereas his epistemological view was destined to lead to idealism. It is ironical but not accidental that Locke while fighting innatism of the Cartesians was paving way for an ontological position adopted by the Cartesians, viz., anti-materialism. This is evident from "the strong apriori flavour"[2] which "experience" has in Locke and even in Hume. As Yolton points out: "Despite his remark in (Essay) II X 2 that ideas are nothing "but actual perceptions in the mind", his more careful statements keep act and content (of ideas) distinct."[3] Inspite of all his opposition to innatism "in no case has Locke claimed that ideas arise...in the absence of mental operations."[4]

Same philosophers characterise the empiricist epistemology as passive on account of its almost exclusive emphasis on the receptive role of mind in acquiring knowledge. Thus, Popper, characterises the conception of mind implied by empiricist as 'the Bucket theory of mind' and its conception of science as 'the Bucket theory of science.'[5]

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1. cf. Marx, Karl, The Holy Family, Progress Publishers, 1975, pp.143-153.
2. Yolton, J.W. "Agent Causality", American Philosophical Quarterly, Vol.3 (1966) p.21.
3. "The Concept of Experience in Locke and Hume" Journal of History of Philosophy, Vol. I, 1963, p.55.
4. Ibid, p.59.
5. Objective Knowledge, Oxford Univ. Press 1972, pp.341-361.

But some others consider this characterisation to be unjust. According to Price, for example, "It is...historically false that the empiricists thought the human mind passive. It would be more just to criticise them for making it more active than it can possibly be."[1] In our opinion, empiricism is both passive and active. Its active character is revealed, as we noted in the case of Locke in the conception of experience itself, a conception which led empiricism towards idealist ontology. This point needs some elaboration. Marx writes in The German Ideology that "the chief defect of all previous materialism...is that things...are considered only in the form of the object, but not ...subjectively. Hence, it happened that the active side, in contradistinction to materialism, was set forth by idealism."[2] This sheds light on the contradictory character of empiricism. The passive character of empiricism is to be traced to its invariable genetic association with mechanistic materialism which entails a photographic conception of reality and knowledge. This is evident from the history of Greek atomism and modern materialism fathered by Bacon. The philosophical link between materialism and empiricism is nominalism, which in fact is "first form of materialsm"[3] But since the recognition of the "active side" of knowledge is necessary for any adequate theory of knowledge and since mechanistic

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1. Thinking and Experience, Hutchinson 1953, p.199.

2. German Ideology, Progress Publishers, 1976, p.618.

3. Marx, Karl, The Holy Family, Progress Publishers, 1975 p.150.

materialism is inherently incapable of consistently making room for "active" character of knowledge, empiricism drifted away from materialism. In fact, "any (philosophical) account of experience will already be a conceptualization of experience: it must be made from the reflective level."[1] Thus, in spite of its genesis in materialism, empiricism was forced to embrace even an idealism that repudiates the first principles of materialism since in recognising the active side of knowledge it "passes into an intellectual entity; ... (and) evolves all the consistency regardless of consequences, characteristic of intellect."[2] We may group, following C Wright Mills' classification of sociological schools[3], the various streams of epistemological thought, classical as well as modern, into three main categories:

1. The Grand theories such as Rationalism and Empiricism and their amalgamations. They are grand in the sense that they come to be tagged with some metaphysical view.*

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1. Yolton, J.W. op. cit. p.53.
2. Marx, Karl, op. cit. p.151.
3. The Sociological Imagination, Pelican, 1970, pp. 30-31

* It cannot be argued that Humean empiricism because of its avowed positivist commitment cannot be said to have been tagged to a metaphysics. For, in spite of his intention to commit all metaphysical illusion and sophistry to flame he exhorts that we must "cultivate true metaphysics with some care in order to destroy the false and adulterate" (quoted in Yolton, J.W. "The Concept of Experience in Locke and Hume" Journal of History of Philosophy, Vol.I, 1963, p.69.

2. Formalst theories consisting of on the one hand various forms of neo-empiricism and on the other, the recent epistemological vidws such as conventionalism and some versions of instrumentalism whose relation with empiricism is quite tenuous. They attempt to solve epistemological questions within the framework of a general knowledge without presupposing (at least explicitly) any metaphysical view.
3. Piece-meal analysis which rejects altogether the possibility of a general theory of knowledge. It studies each epistemological issue on its merit leading to a miseellany which has been transformed into a style of thought. The epistemological attempts of the ordinary language philosophers fall under this category.

The views falling in the first and the second group share a fundamental similarity in that they both have an architectomic conception of knowledge. Irrespective of the differences in emphasis and approach, an essentialist conception of knowledge, i.e. that knowledge has a certain hard-core, is implied in their accounts. The essentialist conception involves: (i) that there are some basic conditions which must be satisfied by anything that is to be regarded as an instance of knowledge; (ii) that knowledge must be related in specifiable ways to certain preferred candidates which function as its foundational elements or basics.

The preferred foundational elements are supposed to satisfy the basic conditions by their very nature; and (iii) that the purpose of a theory of knowledge is to show how the superstructure of knowledge (ordinary perceptual and/or scientific) can be justified in terms of the preferred basics. The picture of knowledge thus projected is like that of a finished building.

The essentialist or the architectonic conception of knowledge, as Quine points out, has two aspects: conceptual and doctrinal. The former relates to meaning where the higher order concepts such as 'physical object' or 'theoretical entity' are accounted for in terms of what are regarded as basics; and the latter relates to truth where ~~the~~ knowledge claims are sought to be justified in terms of the basic statements, such as sense-data statements or observation statements. Such a conception of knowledge also finds expression in the philosophical studies of the foundations of mathematics. Accordingly, the essentialist/architectonic programme in Mathematics derives all the required higher-order concepts from certain primitives, and generates proofs for all the theorems or provable mathematical statements from self-evident truths. The climax of such a programme is reached in the reduction of Mathematics to logic. Thus Quine observes: "Just as mathematics is to be reduced to logic, or logic and set theory, so natural knowledge is to be based somehow on sense-experience. This means explaining

the notion of body in sensory terms; here is the conceptual side. And it means justifying our knowledge of truths of nature in sensory terms; here is the doctrinal side of the bifurcation."[1]

The traditional school of Rationalism undertakes only the doctrinal part of the programme in which the so called clear, distinct and a priori ideas serve as terms of reference. It is noteworthy that a consistent rationalist is bound to admit, to his dismay, that the propositions about the external world turn out to be logicaly true or logically false on his interpretation.[2] Traditional Empiricism, on the other hand, emphasises both the conceptual as well as the doctrinal sides of the programme. This is amply manifested in the reductionist programme of the phenomenalist version of the traditional empiricism. Indeed, any philosopher who wants to retain his empiricist commitment will have to adopt such a programme. For, otherwise he cannot totally escape representationalism which quickly and naturally leads to an agnostic predicament, i.e. the view that reality always remains opaque to comprehension. However, in spite of reductionism and what is worse, because of reductionism, empiricists fail in accomplishing the doctrinal aspect of their programme. This is clearly borne out by the Humean Predicament. What is more, just as rationalists landed in the

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1. "Epistemology naturalized", The Psychology of Knowing ed. J.R. Royce and Wm. W. Rozeboom Gordon & Breach, 1972, p.10.
2. cf. Watling, J.L. "Descartes", A Critical History of Western Philosophy ed. by O'Connor D.J. The Free Press of Glencoe, 1964; p.174.

semantic anamoly mentioned earlier, the empiricists are also pushed into the same anamoly by their reductionist claim. In other words, a synthetic proposition becomes analytic in the phenomenalist scheme, for example, "Rose is red" is a synthetic proposition. But if "Rose" is nothing but "redness", "softness" etc. as phenomenalists claim, the proposition "Rose is red" turns out to be "Redness, Softness etc. is red" which is either analytic or absurd. Modern empiricism (the formalist theories) with all its variations tries to carry out the doctrinal aspect of the programme as is evident in the case of Ayer and Chisholm.

In contrast, according to the ordinary language philosophy, "we must do away with all explanation, and description alone must take its place. And this description gets its light, thatis to say, its purpose, from the philosophical problems...they are solved, rather, by looking into the workings of our language."[1] If the ordinary language philosophy stand is adopted then it would appear that philosophy cannot provide any explanatory theory. "If one tried to advance theses in philosophy, it would never be possible to debate them."[2] Thus, it does not even acknowledge the possibility of a general theory of knowledge. There are no basic conditions or "hard-core" of knowledge. It argues that different knowledge

1. Wittgenstein, Philosophical Investigations, Basil Blackwell and Mott Ltd., 1958, p.47.

2. Ibid, p.50.

situations have only "a family resemblance". Accordingly it dissolves the problem of knowledge rather than solve it.

The approach of the grand theories and formalist theories to the epistemological issues is normative, whereas it is descriptive in the case of the ordinary language philosophy. The normative character of the grand theories is made evident by what they take to be the fundamental issue, viz. the valid source of knowledge. Similarly the normative character of the formalist theories is brought out in their search for justification of ordinary perceptual and scientific knowledge. In contra-distinction to this, the ordinary language philosophy maintains that the desire to give an explanatory theory is illegitimate born out of conceptual confusions which can be brought out by describing the way in which we use the word "know" and other related epistemic concepts. It is important, however, to note here that the ordinary language philosophy seems to concede by implication that the possibility of a theory of knowledge is parasitic upon the existence of some basic conditions constituting the essence or "hard-core" of knowledge. Consequently in its scheme, the possibility of systematic epistemology and essentialist conception of knowledge seem to stand or fall together. In our view, the architectomic picture of knowledge is wholly unsatisfactory. It not only misportrays knowledge, but inevitably leads to irresolvable controversies which have infested the history of epistemology all long . And, especially on the face of the challenge posed

by the sceptic whom it actually fosters, it lands itself into, to use Erikson's phrase, "A crisis of integrity" which can be finally traced to basic mal-identification of knowledge by its protogonists.

Speaking of the philosophers of science whose discussions of certain crucial concepts in microphysics do not square with their employment by physicists, Hanson observes:

> They have regarded as paradigms of physical inquiry not unsettled, dynamic, research sciences like microphysics, but finished systems, planetary mechanics, optics, electromagnetism and classical thermodynamics...If this attitude is accepted, the proper activity for philosophers of physics would then appear to be either (1) to study the logic of the deductive systems which carry the content of microphysics, or (2) to study statistical methods whereby microphysical theories are built up from repetitive samplings of data. These two approaches may apply to 'classical' disciplines. But there are not research sciences any longer, though they were at one time - a fact that historians and philosophers of science are in danger of forgetting. Now, however, they constitute a different kind of physics altogether. Distinctions which at present apply to them ought to be suspect when transferred to research disciplines; indeed those distinctions afford an artificial account even of the kinds of activities in which Kepler, Galileo and Newton themselves are actually engaged."1

What Hanson says in the context of scientific knowledge can equally be said of perception as well as of knowledge in general. Implied in Hanson's observation is the recognition of an essential feature of knowledge, namely its dynamic or growing character whose significance has eluded the traditional and most of the modern

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1. <u>Patterns of Discovery</u>: Cambridge Univ. Press, 1958, p.1.

epistemological enquiries. The essentialist view of knowledge either soft-peddles the dynamic character of knowledge or relegates it to an inconsequential position.

Once knowledge is conceived in a static frame, the immediate problem that asserts itself is the search for certain epistemological basics or primary elements upon which the superstructure of knowledge can be securely founded. We shall see later, in Chapter 2, 3 and 5 that alleged basics or primary elements are themselves of questionable nature.

Before we proceed further, some general remarks about the unifying elements in the approaches categorised above are in order.

As indicated above, the search for epistemologically prior elements is common to both the grand and the formalist theories. An all important characteristic of such basics is supposed to be their simplicity. Implicit in it seems to be the Cartesian view that knowledge of simples is more certain than that of complex things. Such a view involves unwarranted assimilation of complexity and corrigibility. However, the error in perception need not result from the complexity of the object perceived. Moreover, the search for epistemological simples involves, as Peter Alexander points out, a confusion between psychological considerations, which seek to ensure that there is something of which we are certain, and the logical programme which seeks to provide a starting

point so as to systematise knowledge. Thus, Prof. Alexander observes:

> Like Descartes, sensationalists have... confused the reasons for demanding simplicity and so failed to see the nature of the problems. This is perhaps because inside every empiricist there is a ratinnalist screaming for release and every rationalist is similarly haunted by an empiricist. It is incidentally important that, in each case, the man inside is not fool. Descartes thinks that a clear and distinct idea must correspond to an elemnt in the external world and Mach that because it is indubitable that our sensations are just as they seem they will function as primitives in a deductive systematisation of knowledge. Descartes' view collapses because the correspondence is not self-evident, Mach's because indubitability of the sensations cannot be transferred to the statements about them...The logician's requirements can be satisfied by the adoption of a convention which, within certain limits, may be arbitrary for his system...But the sensationalist epistemologist cannot be sure that this convention will delineate elements of our experience about which we can be certain, or even that it will delineate elements of our experience. The rationalist in him does not mind whether his analysis ends e.g., in uniformly coloured patches of whatever size or in uniformly coloured patches of minimum discernible size, so long as his analysis works, but the empiricist outside demands that he choose whichever it will be impossible for us to make mistakes about. The task of discovering what, if anything, is basic in our experience involves psychological as well as logical considerations.[1]

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1. Sensationalism ad Scientific Explanations. Routledge and Kegan Paul; 1963, pp.46-47.

Speaking of Hume, Antony Flew rightly observes:

> In his account of arguing from experience Hume implicitly presupposes an exclusively deductive ideal of reason. He first sets upon incomplete syllogism as displaying the form of all arguments from experience. Then he shows that there is no satisfactory way of establishing the missing premise. From this he proceeds to argue that reason and "understanding has no part in the operations" (Enquiry, Section V) and then to seek out and examine the principle of human nature which gives this mighty authority to experience" (Enquiry, section IV). In all this he is being incongruously Cartesian.1

What follows from the above is that the two grand theories-Rationalism and Empiricism though stand in contradistinction to each other share the same dogmas, namely, one, that 'simplicity' is the only avenue for epistemological salvation- a dogma which coupled with the belief that the subjective elements like sense-impressions provide more secure starting point commits empiricism directly and invariably to an idealist ontology; and two, that a philosophically satisfactory proof has to be deductive in character. The obsession with the deductive ideal is shared not only by the grand theories but also by the formalist schools. That is, both traditional as well as modern versions of causal and sensationalist theories of perception on the one hand and inductivist - descriptivist view on the other, deem that the ideal of reason implicit in the structure of inference required to justify knowledge-

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1. "Induction and Standards of Rationality" <u>Introduction to Modern Philosophy</u>, ed. Pap and Edwards, Free Press New York, 1965, p.160.

claims is deductive. The very idea that perceptual knowledge needs justification, the mode of the attempt made and the failure confessed betray the strong belief in deductive knowledge as the paradigm of justified knowledge. In the field of philosophy of science, inductivism accepts deductive ideal in an elliptical manner. This is evident,on the one hand, in the attempts of traditional inductivist like Mill to develop an inductive logic supposedly approximating deductive logic in kind if not in degree, and on the other hand in the attempts of modern inductivist to characterize scientific theories as statements with no more cognitive content than those of observation statements which the theoretical statements are supposed to summarise.

Thus, to reiterate, common to both grand theories and formalist schools are 1. the search for certainty. 2. an illegitimate assimilation of logical simplicity and epistemological security. 3. an obsession with the deductive ideal, and 4. the belief ~~that~~ in subjective elements like sense-impressions or sense data in the case of perception and pure observation in the case of scientific knowledge.

Similarly, we find thatthe formalist schools and ordinary language philosophy adhere to a semantic conception of knowledge, i.e. the view that the problem of knowledge is basically linguistic. In the case of logical positivist epistemology, which is a form of

formalist approach, the semantic conception of knowledge is made evident by the fact that the problem of knowledge is treated only on the background of a criterion of meaningfulness. The other formalist epistemologies hold in a variety of ways that the problem of knowledge can be solved by making proper linguistic recomendations. Ordinary language philosophers, or descriptive analysts dissolve the epistemological problems by treating knowledge claims to be no more than speech-acts. Thus, in spite of their methodological differences the formalists as well as the descriptive analysts implicitly maintain the priority of "language" over "knowledge". It is difficult to find any justification for this assumption. "Our inability to device an ideal language which would in advance prepare categories adequate for future inquiry reflects perhaps the very nature of human cognition...To refine language in advance so as to make it a suitable and adequate medium for future inquiries would mean no less than to anticipate the process of discovery."[1] As we shall see later, of the two concepts, "language" and "knowledge" neither is prior to the other.

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1. Skolimowski, H. "Knowledge, Language and Rationality" Boston Studies in the Philosophy of Science ed. Cohen and Wartofsky. Vol.IV (1969) p.179.

1.3 Structure of the Dissertation And the Main Thesis

Part I and Part II deal with perception and scientific knowledge respectively. As pointed out earlier, most non-realist theories have an empiricist orientation. In this respect they share an architectonic or essentialistic conception of knowledge. There are, however, some non-realist theories, for example, that of Maxwell in the field of philosophy of perception, conventionalism and some versions of instrumentalism in the field of science, where connection with empiricism is somewhat tenuous. In considering non-realist theories, though we shall focus our attention on these theories which are empiricist in character, we shall also consider some of the important non-realist theories which are of non-empiricist variety.

In Part I, we begin with a consideration of the various non-realst theories of perception. Our effort will be to show, among other things, how they fail in achieving their avowed purpose by providing justification to perceptual knowledge.

Chapter 2 which deals with sense-datum theory concerns itself with a critical study of the Ayerian version of the sense-datum theory. After a brief elucidation of Ayer's position we show its untenability by exhibiting the inadequacy of the conceptions of language, knowledge and science implied therein. We have chosen Ayer as the representative of the sense-datum theory because his is the

most evolved version. One finds Ayer in constant dialogue with his critics. Consequently, his position has undergone several modifications. The latest version of Ayer's view comes to be neatly tagged to the empiricist conception of scientific method. In other sense-datum theories like that of Moore, Russell, Price and others, the possibility of private language which is implicit in any sense-datum theory, is neither articulated adequately nor defended. Thus, by bringing together empiricist conceptions of language, knowledge and science within the gamut of an articulated epistemological position Ayer lends to sense-datum theory a completeness missing in other varieties of sense-datum theory. In this respect his theory represents an ideal to which most other theories try to approximate either intentionally or implicitly. Therefore, a detailed examination of this theory provides us with a scale against which other formalist theories considered in Chapter 3 are measured.

Chapter 3 considers some other recent theories of perception, viz, Evidential theory of Chisholm, Causal theories of perception of Grice and Maxwell and Pragmatic analysis of Nelson Goodman.

Chisholm adopts a harmless or truncated notion of sense-data i.e. 'sense-data' stripped of its incorrigibility pretence. Yet he tries to work out a justificationary scheme for perceptual knowledge in a novel way.

Of the two versions of causal theory of perception, viz, linguistic and empirical, it is only in Grice that we find the former explicated in its pure form. Confining himself to a mere logical analysis of perceptual statements, he eschews every trace of representationalism of the classical sort and thus tries to make his position invulnerable to the usual attacks on the causal theory of perception.

Maxwell candidly puts forward the empirical version of the causal theory of perception. He puts forward a scheme of the relation between objects of ordinary perception and entities of science.

We have considered Goodman since it is only in him that we find pragmatic analysis characterised by the phenomenalistic propensity of an empiricist philosopher. Thus, Goodman's view exemplifies along with those of Chisholm and Grice essentialistic and architectonic conception of knowledge. Further Goodman's approach in spite of its ideal language methodology has strong ontological flavour which is rather unusual in the analytic tradition.

In Chapter 4 we develop our account of perceptual knowledge. Our major contention is that perception is entirely theory dependent. In this context we try to explicate the connection between language and perceptual knowledge. The theory dependent character of perceptual knowledge, in our view, reveals four noteworthy features. They are 1. that to perceive is to perceive in relations; 2. that realism is necessarily true, 3. that perception is

socially determined and 4. that objectivity of perceptual knowledge is to be sought in terms of the inter-subjectively shared theoretical framework.

Part 2 of the thesis deals with the nature of scientific knowledge. In Chapter 5 we begin with an examination of the realist and the non-realist positions vis-a-vis the nature of scientific theories and the status of theoretical entities in science. Certain important non-realist meta-scientific theories viz., Descriptivism, Instrumentalism and Conventionalism, are critically discussed, in this context.

Analogous to the ideas about perceptual knowledge developed in Chapter 4, a meta-scientific view is outlined in Chapter 6 In our view there is a parallelism between ordinary, commonsensical perceptual and scientific knowledge. Thus, to begin with, scientific knowledge too is theory dependent through and through. We will try to show schematically with the help of Mary Hesse's learning model how observation and theory get related in the actual process of scientific activity. Further, theoretical entities of science like the objects of perception are real in the sense that they are not instrumental or heuristic. They have an independent ontological status. Similarly, like perceptual knowledge, scientific knowledge is also purpose-oriented and socialy determined. The objectivity of scientific knowledge is grounded in the inter-subjectively shared paradigm without which scientific knowledge would

be impossible.

Finally, in the concluding chapter, that is Chapter 7 we outline a general theory of knowledge based on our discussion in Chapter 5. Needless to say, we do not share the theoretical stance of ordinary language philosophy. In our view, it is possible to develop a general theory of knowledge without having to adopt essentialism. The major ideas developed in our account are as follows:

First, knowledge, both perceptual and scientific, involves a web of interrelated concepts. That is to say, knowledge at every stage is theory-laden. Second, since we do not recognise any preferred candidates for providing the basis, the entities that figure in the so-called theoretical superstructure, in our view, have an autonomous and substantive reality. Third, knowledge is purposive in character. Fourth, it is socially determined. Fifth, the growth of knowledge is adaptive and dialectical in character. Finally, its objectivity is founded, on the one hand, on the intersubjectivity or publicly shared theoretical framework, and, on the other, in its roots, in praxis.

PART I : PERCEPTUAL KNOWLEDGE

CHAPTER 2

NON-REALIST THEORIES OF PERCEPTION -SENSE-DATUM THEORY

2.1 Exposition

Our discussion of the various non-realist theories of perception begins with sense-datum theory. Paradoxical as it may appear, strictly speaking, 'Sense-datum theory' is a misnomer since it does not name just one particular theory. What ordinarily goes under its heading are a variety of views or theories, ranging from the claim that statements about physical objects are reducible to statements concerning sensations or sense-contents, to a relatively weak claim that physical object statements are (or can be) ultimately justified only in terms of experience. For our purpose, however, it is not necessary to go into its history and provide an account of all its versions. Our main objective in this chapter is to examine the belief that perceptual knowledge is ultimately founded on something 'given', i.e., pure experience; and, hence can be justified only in terms of the 'given'. It is this belief which is not only basic to all versions of Sense-datum theory but has strong roots in the traditional empiricism.

The Sense-datum theory as propounded by Ayer is, in our view, its most sophisticated version in so far as the articulation and the defence of its main thesis are concerned. Therefore, we shall confine our discussion of Sense-datum theory to a consideration of Ayer's position

only. It is worth remarking though, that even in Ayer's hand sense-datum theory passes through various stages of development and each stage is characterized by important modifications of the previous stage. Three such stages are clearly discernible in his writings: the first edition of Language, Truth and Logic (1936) provides Ayer's earliest formulations of the theory. In the introduction to the second edition of Language, Truth and Logic, he presents a modified version; and further develops and defends it in the Foundations of Empirical Knowledge (1940) and Philosophical Essays (1954). However, it is in The Problem of Knowledge (1956) and The Central Questions of Philosophy (1973) that Ayer expounds his final version of the Sense-datum theory. In discussing Ayer's position, therefore, our interest will mainly be focussed on the last version of his theory; discussion of his earlier positions will be kept to the barest minimum since it is intended only to provide continuity to his ideas.

At the first stage, Ayer's solution to the philosophical problem of perception, i.e. 'How are perceptual claims about physical objects to be interpreted?' can be characterized as phenomenalist (or 'reductionist' or 'constructionist'). According to it, every sentence about a physical object can be translated into or reduced to sentences which refer to nothing but sense-experiences and relations amongst them. In other words, his phenomenalist thesis is not about the constitution of physical objects; instead it is about

sentences or propositions about physical objects. Thus, Ayer says:

> When it is said that a material thing is constituted by both actual and possible sense-contents, all that is being asserted is that the sentences referring to sense-contents, which are the translations of sentences referring to any material thing, are both categorical and hypothetical. 1

Evidently, the sense-contents are neither physical nor mental. According to Ayer, only constructions can be physical or mental.

> The answer to the question whether sense-contents are mental or physical is that they are neither; or rather, that the distinction between what is mental and what is physical does not apply to sense-contents. It applies only to objects which are logical constructions out of them. But what differentiates one such logical construction from another is the fact that it is constituted by different sense-contents or by the sense-contents differently related.2

It should be noted here that Ayer states his phenomenalistic programme only in general terms along with his arguments as to why it ought to be accepted. But he gives no indication as to how in particular cases this programme is actually to be implemented. He only says, for instance, "I am sitting in front of the table" can in principle be translated into a sentence which does not mention tables, but only sense-contents."[3]

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1. <u>Language, Truth and Logic</u>, Pelican, 1971, p.88
2. Ibid, p.162.
3. Ibid, p.86.

It appears at this stage, that the analysis of physical object statements into statements about sense-data, is proposed primarily to dispel the confusions which arise from an imperfect understanding of certain types of sentences in our ordinary language,[1] and because of which the traditionalist lapsed into metaphysical theorizing. One may, therefore, argue against our characterization of empiricism in the 'Introduction', that contrary to our position, the main thrust of the sense-datum theory which is but an instance of empiricism, is not to work out a justificationary scheme for ordinary perceptual claims so as to ground knowledge firmly; but, the argument may run, only to denude empiricism and the rest of their metaphysical 'nonsense' by flushing out confusions and absurdities from our language and unveiling its logical complexities. One might, thus, conclude that the adoption of reductionism by Ayer not only is not intended to provide secure foundations to knowledge, but it involves a clear recognition of the futility of the architectural conception of knowledge, since, according to Ayer all synthetic propositions, "including the propositions which describe the content of the sensations, are hypotheses which, however great their probability, we may eventually find it expedient to abandon."[2]

Granting that Ayer's main enemy here appears to be metaphysics, one should, however, ask, what is so abnoxious about metaphysics that it must be discarded at all costs?

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1. Ibid, p.83.
2. Ibid, p.160.

Is it not because metaphysics is considered a gateway for the sceptic (and the agnostic as well) to creep in and question the very possibility of empirical knowledge which the sense-datum theorist is so assiduously trying to preserve? Besides, the sense-datum theorist would hardly be able to defend his preference for the sense-datum language if all that he could say by way of explanation was that expressibility of significant truths in physicalist language is a contingent fact and that our ordinary language is inconvenient and cumbersome. In order to effectively meet the physicalist's charge that sense-data are mythical entities imposed through philosophical confusions, what is required of him is to show that sense-datum language is necessary in order to bring out the 'hard-core' underlying all knowledge claims. Whether or not the sense-datum theorist succeeds in showing it, is a debatable matter. We shall, argue later that he does not. But what cannot be seriously doubted is that the reduction of our ordinary perceptual claims to claims about sense-data is attempted only to set forth a justificationary analysis which, as Carnap tried to show in his <u>The Logical Structure of the World</u> traces back the significance of our material object statements in such a fashion as ultimately to ground these statements securely upon epistemologically elementary factors. Ayer is constrained to regard sense-datum statements as corrigible so as to be consistent with the conceptual

scheme of logical empiricism which treats synthetic/ a posteriori and analytic/ a priori propositions as collectively exhaustive and mutually exclusive. But it does not warrant the conclusion that Ayer rejects the architectural conception of knowledge. On the contrary, the fact that the demands of the architectural conception of knowledge cannot be met if sense-datum statements are to be corrigible leads Ayer subsequently to the position that sense-datum statements are corrigible but only verbally.

However, doubts about the translatability of statements concerning physical objects into statements concerning sense-data lead Ayer to modify his position. The failure of the phenomenalistic programme is clearly acknowledged in the introduction to the 2nd edition of <u>Language, Truth and Logic</u>, where he declares that "no finite set of observation-statements is ever equivalent to a statement about a material thing."[1] For the success of the reductionist programme, it is necessary that we should be able to point to the occurrence of a particular sense-data as being entailed by a given material object statement. But, Ayer comes to realize now, that "there is no set of statements about the occurrence of particular sense-data of which it can truly be said that precisely this is entailed by a given statement about a material thing."[2]

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1. cf. p.31.
2. <u>The Foundations of Empirical Knowledge</u>, Macmillan Paperback, 1969, p.240.

Accordingly, "the truth of a statement about a material thing cannot be formally established by the occurrence of any one particular, finite series of sense-data."[1]

Although, Ayer discards the idea of complete translatability, his modified objective is to work out a justificationary scheme such that,

> While referring to sense-data is not necessarily a way of referringto physical objects, referring to physical objects is necessarily a way of referring to sense-data.2

Thus, in order to secure firm grounds for material object statements as verified through their sense language implications, Ayer now takes recourse to approximate reduction in place of complete reduction. He says:

> What one can do ... is to construct a schema which shows what sort of relations must obtain between sense-contents for it to be true, in any given case, that a material object exists: and while this process cannot, properly speaking, be said to yield a definition, it does have the effect of showing now the one type of statement is related to the other.3

In the modified scheme, material objects are claimed to be constructed out of sense contents in accordance with the 'laws of sensory association'[4]. These are:

> ...first, the relation of resemblance between indidividual sense-data; secondly, the comparative stability of the contexts in which these resemblant sense-data occur; thirdly, the fact that the occurrence of such sense-data is systematically repeatable, ... and fourthly the dependence of this repetition upon movement of the observer.5

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1. Ibid, p.240.
2, Philosophical Essays (1956), Macmillan, Paperback(196)p.104
3. Language, Truth and Logic, p.31-32.
4. The Foundations of Empirical Knowledge, pp.249-62.
5. Ibid, p.259.

Implied in the second version of sense-datum theory are two notions, viz. 'incorrigibility' and 'private language', which require special mention. Earlier, while stating Ayer's first formulation of the sense-datum theory, it was pointed out that since any process of verification is claimed to be describable in terms of sense-datum language, corrigibility of sense-datum statements is not quite in keeping with the requirement of providing a firm foundation to knowledge. But, Ayer explicitly states, "unless it is possible for some empirical propositions to be "incorrigible", there can be no ground for supposing any empirical proposition to be true".[1] This shortcoming of the earlier position is sought to be met by according a privileged position exclusively to sensedatum propositions. Ayer says:

> ... in the case of a sentence which refers to a sense-datum, it is possible to be mistaken about the truth of the proposition expressed, so long as one is not actually observing the relevant fact. But there is no such possibility of error when the sense-datum in question is actually being sensed. For in that case <u>the use of the sentence is prescribed by a rule of language</u>; so that to make an assertion that does not correspond to the fact is either to tell a deliberate lie or to make a verbal mistake (emphasis added).2

What distinguishes one's awareness of a sense-datum from one's perception of a material thing is the fact that one cannot be mistaken in the former case whereas in the

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1. Ibid, p.112.

2. Ibid, p.111.

later one is liable to be wrong.[1] Accordingly, only a sense-datum proposition acquires incorrigibility because its meaning is,

> precisely determined by the <u>rule that correlates it with the sense-datum in question</u>, such precision is not attainable in the case of a sentence which refers to a material thing. For the proposition which such a sentence expresses differs from a proposition about sense-datum in that there are no observable facts that constitute both necessary and sufficient condition of its truth.2 (emphasis added)

Thus, an 'incorrigible proposition' is defined as "one that is expressed by a sentence the denial of which is a contravention of a non-formal rule of meaning."[3]

Tagged to the notionsof sense-datum and non-formal meaning rule is the possibility of a private language. Since the use of a sense-datum proposition is said to be prescribed by a 'non-formal rule of meaning' which determines its meaning so precisely as to render it incorrigible, such meaning rule(s) must be possible. This means that a language system must be possible within which sense-datum propositions acquire their meaning and are guaranteed incorrigibility. Not only is the possibility of a private language necessary to bestow 'incorrigibility' on sense-data propositions; it must also be independent of the public or ordinary language since it is possible for a sense-data proposition to be true even "when the corresponding physical proposition

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1. Ibid, p.134.
2. Ibid, p.110.
3. Ibid, p.112.

was false!"[1] At the same time, private language must in some sense, provide a basis for public language, because, as Ayer says, "it is only in terms ofwhat we individually experience that these physical propositions can be understood by us at all."[2]

The third phase of Ayer's sense-datum theory needs an elaborate exposition. Here, the phenomenalistic analysis or reductionism, complete or approximate, is given up totally. Consequently, the sense-datum theory is now formulated without incorporating 'incorrigibility'. But an answer to the sceptic is nevertheless claimed to have been worked out. According to Ayer sense-datum theory is neither an empirical theory nor a reflection of the ordinary usage of sensory verbs like 'hear', 'touch', 'see' etc. It is a linguistic recommendation which the sense-datum theorists are forced to make because "it alone permits them to give an adequate account of what perception is."[3]

The argument from illusion is used by Ayer as an avenue to introduce sense-data. From the fact that illusions are possible, it follows that the ordinary ways of speaking about what one perceives make stronger claim than perception itself warrants. Thus, it is argued that

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1. Ibid, p.151.
2. Ibid, p.152.
3. The Problem of Knowledge, p.87.

it will not necessarily be true that whenever it seems to me that I am perceiving something, I really am perceiving it. But the converse holds. Ayer says that, "whenever anyone perceives, or thinks that he perceives, a physical object, he must at least be, in the appropriate sense, perceiving a seeming object. These seeming-objects are sense-data."[1] Thus for example, from (1) 'I see a cigarette case.' follows, (2) 'It seems to me that I see a cigarette case or something', and from (2) follows (3) 'I am now seeing a seeming cigarette case.' The 'seeming cigarette case' is an example of sense-datum.

The transition from (1) to (2) is justified on the ground that we use the expression "it seems that" as a means of signifying how things look, or feel, or otherwise appear, irrespective of any judgement that one may be led to make about their physical existence, or of the degree of confidence with which one makes it."[2] Similarly as regards the inference of (3) from (2), Ayer argues: "The transition from 'it now seems to me that I see X' to 'there is a seeming-x which I now see' may be defended on the ground that the second sentence is merely a reformulation which it is convenient to make because it is simpler and neater to make the nouns to do the work of the verbs."[3] Hence nothing that can be said about sense-data should be such

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1. Problems of Knowledge, Pelican, 1969, pp.96-97.
2. Ibid, p.102.
3. Ibid, p.109.

that it cannot be translated into the terminology of 'seeming'. According to Ayer, though there are no general rules for answering questions about the identity and discrimination of sense-data, it does not mean that in particular cases we can not identify or discriminate between different sense-data.

Even though sense-data language depends on language of physical objects, according to Ayer, this dependence is only psychological and not logical. Thus the autonomy of private language is maintained on the ground that its terminological dependence on public language is only a contingent one. He says:

> ... even if all talk about sense-data derived its meaning from talk about the perception of physical objects, it would not follow that the truth of a statement which implied that some physical object was perceived was, in any given instance, a logical condition of the truth of a statement which was merely descriptive of some sense-data.[1]

We now come to the central issue of the justification of our knowledge of physical objects. The problem of the relation between the sense-data statements and the physical object statements cannot be separated from the problem of justification. Ayer formulates the argument of the sceptic who questions the transition from sense experience to physical object as follows:

(1) Since our knowledge of the conclusion depends entirely on the premises, we have no access to physical objects except through the contents of our sense-experience which themselves are not physical.

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1. Ibid, p.112.

(2) Since there is "no description of our sense-experience, ... from which it follows that a physical object exists",[1] the inference regarding a physical object from sense experience must be non-deductive.

(3) The above inference is not inductive either.

(4) Since these inferences cannot be justified either inductively or deductively, they cannot be justified at all.

Different approaches to the sceptic's challenge deny one or the other step of the sceptic's argument. Naive realism denies the first. Reductionism denies the second. Whereas the naive realist tries to fill the gap created by the sceptic "by bringing the evidence upto the conclusion, the reductionist's policy is to bring the conclusion down to the level of evidence".[2] Scientific approach admits the first two steps, but denies the third. It holds that the gap can be bridged by a legitimate process of inductive reasoning. Finally, descriptive analysis does not contest the premises of the sceptic's argument but only its conclusion. It makes no attempt to bridge the gap. According to it, the inference in question can be analysed, though not proved beyond question. In other words, we can give an account of the procedures that we actually follow. But there is no way to prove that good evidence is really good evidence. And, if there cannot be a proof, it is senseless to demand one.

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1. Ibid, p.76.
2. Ibid, p.79.

For Ayer naive realism is full of truisms and thus it is not "philosophically enlightening";[1] reductionism on the other hand is ready to enter paradoxes to avoid the sceptic, and thus highly unsatisfactory.

Ayer combines the approaches of scientific method and descriptive analysis in order to show that the sceptic suffers a fundamental defeat. According to the scientific approach, factual inference from one level to another is legitimate. Accepting it, what remains for Ayer is to show how exactly "evidence" and "conclusion" are related. This, Ayer does by employing the method descriptive analysis. The scientific method approach, thus, develops into the approach of descriptive analysis.

Ayer begins with a pair of limiting cases: one in which it is impossible for the objects to be there, i.e., "Given that it is the kind of object that is supposed to be perceptible, it surely would follow that it did not exist if there were no circumstances whatsoever in which it would seem to be perceived."[2] Second in which it is impossible for the object not to be there, i.e. "...in what appeared to be the relevant setting the object would always seem to be perceived, no matter what further experiences were obtainable. Then ..., it would logically follow that the object did exist."[3]

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1. ibid, p.82.
2. Ibid, p.130.
3. Ibid, p.130-31.

The limiting cases are given to replace phenomenalism which fails to establish logical connection between the way the physical objects appear to us and the way they really are. Coming to the justification of our particular perceptual claims, Ayer says that "in referring as we do to physical objects, we are elaborating a theory with respect to the evidence of our senses."[1] The physical object statements, in other words, are like theories and sense-datum statements are like observation statements. As in science, or to be more precise, in the empiricist conception of science, the latter justify the former.

> The theory is richer than anything that could be yielded by an attempt to reformulate it at the sensory level. But this does not mean that it has any other supply of wealth than the phenomena over which it ranges. It is because of this indeed that that constitutes its justification.2

It is obvious that this conception of justification is based on the empiricist conception of science.

It may be asked as to why Ayer does not adopt the descriptive analyst's approach to reject the very first premise of the sceptic's argument. The answer simply is that the conception of knowledge implied in the sceptic's first premise is necessary for the empiricist's to make a meaningful start. But this conception of knowledge is supposed to follow from the possibility of illusion.

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1. Ibid, p.132.

2. Ibid, p.132.

We will later see whether or not it does. At present it is enough to note that empiricism hangs on not only a conception of language and knowledge, but on a conception of science also.

Now, the question is whether or not there is amy one strand of thought running through the three stages of development. It may be pointed out that on two counts Ayer's position remains more or less the same throughout the three (especially the last two) stages. (a) His acceptance of the first premise of the sceptic's argument mentioned earlier. (b) His stand with regard to the justification of knowledge, namely, that since from the possibility of illusion it follows that in perceptual claims one claims more than what is warranted. Knowledge needs justification. The Problem of Knowledge, can be seen as a fulfilment of this demand. Responding to Austin's attack on the sort of justification sought in the Foundations of Empirical Knowledge Ayer says that "the support which experiential statements give to statements which imply the existence of physical objects never, in my view, amounts to logical entailment. This is sometimes said to have the consequence that statements which imply the existence of physical objects are not conclusively verifiable. Austin objects to this way ofspeaking, I think, justifiably"[1]

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1. Metaphysics and Common Sense, Macmillan, 1969, p.146.

Consequently, Ayer restates his position in The Problem of Knowledge. The justification as worked out in The Problem of Knowledge, can be considered as the strongest mechanism that empiricism can provide for knowledge (and for itself). Moreover the conception of justification as presented in The Problem of Knowledge is in conformity with and (even follows from) the empiricist philosophy of scientific method. 'Justification' in this context is a link between empiricist conceptions of knowledge and scientific explanation.

Now, since central to Ayer's theory of sense-data are the empiricist conceptions of language and knowledge along with a conception of science, in order to evaluate the sense-datum theory of perception, we shall consider in detail these conceptions. It is in this context that we shall examine important assumptions upon which depends the viability of the sense-datum theory. Our aim, therefore, is not to point out the failures of the theory at every step including its over-simplification of concepts as Austin shows in his Sense and Sensibilia. We question the very premises of the programmes, For as Ayer himself points out, "it is only by showing them to be unwarranted that the theory can be cut off at its source."[1] In this connection, we shall take The Problem of Knowledge*as the central work of Ayer.

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1. Ibid, p.128.

* Ayer considers it to be his best work. cf. Listner Vol.84, No.2179, Dec.31, 1970.

2.2 Conception of Language

It might appear unreasonable to discuss here a conception of language which is to be found in the Foundations of Empirical Knowledge. It might be argued that since Ayer himself subsequently gives up the incorrigibility claim with regard to sense-data statements, the conception of language implied in the idea of sense-data statements being incorrigible also stands rejected. It is, of course, true that Ayer in the latest version of his Sense-datum theory no longer subscribes to the incorrigibility thesis, but it would not be correct to conclude from this that he altogether dispenses with the conception of language implied therein. Despite the fact that he now recognizes that "the notion of sense-datum is not precise... it appears to borrow what little precision it has from the way in which we talk about physical objects."[1], Ayer regards it only a contingent fact that "we are all brought up to understand a form of language in which the perception of physical objects is treated as the standard case"[2] Therefore, according to him it is "not inconceivable that there should be a language in which sense-experiences were described by the use of purely qualitative expressions which carried no reference to the appearances of physical objects."[3]

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1. The Problem of Knowledge, p.111.

2. Ibid, p.111.

3. Ibid, p.111.

It is to be noted that in the revised scheme formulated in The Problem of Knowledge, sense-data statements are considered least insecure in the sense that they claim least. They approximate to the ideal of a purely demonstrative utterance which is by nature devoid of any descriptive content. In his earlier scheme, i.e., in The Foundations of Empirical Knowledge, Ayer treats them as identical with a pure demonstrative; whereas now, in the modified characterization of sense-data statements, the pure demonstrative becomes a differential limit of sense-data statements. Therefore, the character of sense-data statements, and the reasons for which they are introduced can be made intelligible only in the light of the ideal of a pure demonstrative. In the earlier formulation, truth of sense-datum statements was ensured in terms of the meaning-rules alluded to in the Foundations of Empirical Knowledge and here too their being least insecure can be mentioned only in terms of the meaning-rules which connect words with immediate sense-experience.

Now, as has been pointed out in the preceding section, according to Ayer, the meaning rules are as basic to language as are the formation and transformation rules. But, for Ayer, the notion of a meaning rule and the notion of sense-data statement are so related that one cannot be understood without the other. Therefore, the meaning rules are though basic to language, they cannot be

explicated independent of the notion of a basic proposition. In other words, they are hinged on to private language. The foundational character of private language, i.e., sense-datum language, is central to Ayer's conception of language.

We should, therefore, ask two questions, at this stage concerning private language. (a) Is private language necessary? And, (b) Is private language possible?

The answer to the first question is obviously 'yes' once we accept Ayer's conception of perceptual knowledge. Because, as we have already seen, it is his conception of perceptual knowledge which logically commits him to the idea of private language. Therefore, an examination of the possibility of private language will have important implication for Ayer's conception of perceptual knowledge.

But, before going to the second question, we should briefly consider whether sense-datum language is necessary for purposes other than epistemological, say, for the purpose of describing certain perceptual situations. We quite satisfactorily use ordinary language in talking about normal perceptions. Even when we talk about hallucinations, dreams and illusions, we use ordinary language and quite satisfactorily. If our talk of hallucinations and illusions etc. in the ordinary language is not satisfactory to the sense-datum theoreist, he must be able to show its inadequacy without the benefit of his theory. Ayer has not succeeded in doing this. If,

however, he were to argue that sense-datum language is necessary in order to bring to surface the similarities between normal, non-normal and abnormal situations, it would not do. For, the ordinary locutions are quite adequate for this purpose as well. As a matter of fact the phrase 'as if' is sufficiently effective in bringing out not only resemblances but also differences. On the other hand, sense-data language not only fails to express differecnes but shows no improvement over ordinary language in expressing similarities.

Therefore, the necessity of a private language cannot be established on any other ground except on grounds of a certain conception of perceptual knowledge.

According to Alston, "One source of the attractiveness for sense-datum language for many philosophers lies in their feeling that we should use a single statement form, or a single (small) set of terms, to describe all perceptual situations. Since any other condidate, such as the "language of appearing" turns out to be insufficiently flexible, it is concluded that we must use sense-datum language."[1] Alston's explanation may be factually correct; but the quest for uniformity itself is subordinate to the quest for a firm foundation for knowledge. This is not merely historical fact, it is inherent in the logic of empiricist approach. Bestowing primacy on 'the quest for

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1. "Is Sense-data Language necessary?", Philosophy of Science, Vol.24, 1957, p.45.

firm foundations' minimises and even hides the importance of the brute fact that epistemology till recently has been a battle ground of empiricism and rationalism.

Now, coming to the second question, we find in Wittgenstein a thorough going scrutiny of the idea of private language. On this issue, therefore, our discussion draws heavily from Wittgenstein's arguments.

A private language is one whose terms refer to the immediate sensations. Thus, a statement in the private language is least dubitable since its claim is extremely limited. Further, it is held that the truth or falsity of a proposition in private language can be meaningfully ascertained only by the subject. Now one cannot deny the possibility of private language on the ground that since the crucial terms of a statement in a private language get their meaning in public language, private language cannot have even elementary autonomous character. For it may be argued that our learning the term in public language is only a contingent matter. Similarly one cannot argue that if sensations were private we could not talk about them in public language; but that we do talk about them in public language shows that sensations are not private; hence, private language' is impossible. For the sense-data theorist might reply non-trivially that the public talk of sensations in no way nullifies their private talk.

Of course, it goes without saying that the protagonists and the critics of 'private language' use 'language' in the same sense. For otherwise their respective positions would be philosophically uninteresting and inconsequential. The following are regarded by the rival camps as the essential features of language:

(1) That use of language involves following rules.

(2) That following rules in language involves having checks on the application of words.

(3) That the checks exist in public language.

If the possibility of private language is based on the idea of bare ostensive definition, the basis is obviously shaky for even when words are learnt ostensively, it presupposes a lot of prior knowledge. The private language philosopher however might not adopt the line of <u>bare</u> ostensive definitions. He might argue that the linguistic background needed for ostensive definitions can be present even in the case of a private language. But it is a questionable claim. We should ask whether or not the possibility of private language can be maintained along with the need for a linguistic background for ostensive definitions. The issue, in other words, is whether or not it is possible to have checks regarding the use of words in private language. Later we shall consider this. Presently let us indicate two important errors on which the idea of private language seems to be based. One is about 'experience'

and the other about 'language'.

The mistake about 'experience' lies in the argument that since other person cannot have my experience, therefore, experience is incommunicable in the sense that others cannot know it. But as Wittgenstein points out, "in one way this is wrong, and in another non-sense."[1] It is false because most often we do know other people's experience in the ordinary sense of the word "know". If to know somebody else's experience is to have it, then the assertion 'no one can know my experience', would be trivial and its denial senseless. And if 'privacy of experiences' means simply that experience can be kept secret, then obviously their secrecy is a contingent matter; consequently their privacy would also be contingent. Therefore, it would be wrong to treat "privacy of experience" as a logical category, and thereupon provide private language an autonomous status.

The mistake about language is not about the need for general linguistic background, but about the function of certain words even in public language. For instance 'pain' is a name if by 'name' we mean what is ordinarily understood, i.e. as one presupposing much stage-setting. The sensation-words do not refer to the sensations in the way in which the sense-data theorist needs.

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1. Philosophical Investigations, Basil Blackwell, 1963, Reprint 1972 p.246.

A sensation-world like 'pain' gets related to pain through pain behaviour; that is, pain and pain behaviour are , therefore, not related in a congingent manner. The possibility of pretence or even mistake is dependent on the behavioural criteria. In other words, if pain-behaviour were related to pain in a contingent manner, pretence would have been impossible. Similarly, if pain were contingently related to pain-behaviour, it would become extremely difficult to account for the stress we lay on 'but', when we say e.g. "He was in severe pain, but he was not wailing", It does not however mean that pain and pain behaviour are same. Pain-behaviour is natural expression of pain, as Wittgenstein says.

Utterances like "No one can have my pain" might appear recalcitrant to what is said above in that they might suggest reference to certain private occurrences. But such utterances only provide greater support to Wittgenstein's argument. They, according to Wittgenstein, are not descriptive. They are only grammatical propositions. The characteristics of a grammatical proposition, as Graver shows, are the following:

> (i)The absurdity which results from the denial of a grammatical proposition is not a formal contradiction and in this respect a grammatical proposition differs from what has ordinarily been called an 'analytic' one. (ii) There is no sharp boundary between grammatical and empirical propositions...(iii) Some propositions may be used as either grammatical or empirical...'Pure water freezes at 0° C'may either be used to teach someone what we mean by '0° centigrade' or teach him a physical fact.1

1."Private Language and Private Sensation" Private Language Argument ed: Jones, Macmillan, 1971, p.98.

Now, the natural employment for a grammatical proposition as "Nobody can have my pain" is to teach someone about the use of a word, and not to support any metaphysical thesis. Therefore, the expression, "No one can have my pain" is misinterpreted in private language argument when it is taken to be descriptive.

We now come to the central question about the possibility of linguistic background in the case of private language. The question is simply whether the notion of private language is a sensible notion, whether private language sharês the characteristics which are to be shared by any thing that can be characterised as language. The most important feature in this context, as pointed out earlier, is the availability of criteria to determine whether or not a word is correctly used. The private language philosopher has to resort to memory for this purpose. But Wittgenstein questions precisely this. According to him memory alone cannot be of any help.[1] When I speak of something being X, immediately the question arises: how do I know what is meant by 'X'? Even when one speaks falsely that something is X, one must know what is meant by 'X'; and it is not possible without there being some public criteria.

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1. Philosophical Investigations, Basil Blackwell, 1972, p.92.

To repeat Wittgenstein's argument we can say that the test by memory leaves us where we are, for we do not have any grounds for saying that we recall the same situation in which we applied the term before. In other words the question whether a meaning-rule is applied correctly or not cannot be settled by the checks memory offers. Memory itself can be correct or incorrect, accurate or inaccurate. It is, therefore, theoretically impossible for memory to be independent of public checks. Thus, to quote Wittgenstein:

> Let us imagine a table (something like dictionary) that exists only in our imagination. A dictionary can be used to justify the translation of a word X by a word Y. But are we also to call it a justification if such a table is to be looked up only in the imagination?-"Well, yes; then it is a subjective justification"- But justification consists in appealing to something independent- But surely I can appeal from one memory to another. For example, I do not know if I have remembered the time of departure of a train right and to check it I call to mind how a page of the time-table looked. Isn't it the same there?" - No; for this process has got to produce a memory which is actually correct. If the mental image of the time-table could not itself be tested for correctness, how could it confirm the correctness of the first memory? (As if someone were to buy several copies of the morning paper to assure himself that what it said was true)1.

Therefore, in private language memory cannot have anything other than itself as its check. Hence it will not make sense to speak of correct or incorrect memory in private

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1. Ibid, p.93-4.

language. The notion of memory in the context of private language is unintelligible. Those who insist upon the efficacy of memory precisely miss this point.

Wittgeenstein decategorizes private language by showing that it cannot be an intelligible category in itself unless it is fundamentally related to something public in which case it ceases to be private in the empiricist sense of 'private'. In other words, "publicity" and "language" are not contingently related as empiricists think.

Ayer, however, argues that Wittgenstein's argument is "based on two assumptions which are untenable."[1] They are:

> (1) "... it is impossible, logically impossible, to understand a sign unless one can either observe the object which it signifies or at least observe something with which the object is naturally associated."[2]
>
> (2) "...that for a person to be able to attach meaning to a sign it is necessary that other people should be capable of understanding it too."[3]

It is true that one finds both assumptions in Wittgenstein, though it is to be borne in mind that Ayer's formulation of (1) is inappropriate in that it suggests the Name theory of meaning which Wittgenstein rejects

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1. "Can there be a private language?" Wittgenstein ed. Pitcher, Anchor Books , 1966, p.258.

2. Ibid, p.258.

3. Ibid, pp.258-259.

in _Philosophical Investigations_. The use ofthe phrase, '...object which it signifies' in (1) is somewhat unfortunate. What is actually implied in what Wittgenstein says is that the meaning of so-called private utterances cannot be isolated from the totality of the linguistic situations or language-games in which Sensation words are used. The occurrence of observable phenomena associated with such words is not fortuitious.

Be that as it may, assumption (1) needs no independent justification. For, Ayer himself recognizes, (2) implies (1)[1]. Therefore, if (2) is justified then (1) also stands justified.

Arguing against (2), Ayer says that "unless something is recognised, without being referred to further test, nothing can be tested."[2] Again, "unless there is something that one is allowed to recognise, no test can never be completed: there will be no justification for the use of any sign at all."[3] The same point is in _The Problem of Knowledge_ when he says "...if one never accepted any identification without a further check one would never identify anything at all."[4] What Ayer means is that

1. Ibid, p.259,
2. Ibid, p.260.
3. Ibid, p.256.
4. _The Problem of Knowledge_, p.61.

without basic recognition which requires no public checks no language including public language is possible. And since basic recognition does not rest on public checks the possibility of a private language cannot be ruled out. Thus, Griffith points out "Ayer's argument depends on opposing a public process of checking to a private process of recognition."[1] Here, Ayer seems to forget that the central point of the argument against private language is not that basic recognising is impossible, but that it is impossible in a purely private sense. The correctness of an identification itself implies that there are checks. Basic recognition without public checks is as inconceivable as public checks without some sort of recognition.

Besides, Ayer's position is vulnerable on another count. The basic recognition that is necessary for the introduction, learning, understanding and use of any particular sign is that of differences and similarities between various aspects of a given situation. But a language cannot be built simply on such a recognition of elementary differences and similarities. For, such an attempt would overlook a logical feature of the relations of difference and similarity, viz, non-transitivity. If A is similar to B and B is similar to C, it does not follow that A

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1. "Ayer on Perception", Mind, 69, 1960, p.498.

is similar to C, though B may be as close to C as A to B in so far as the degree of similarity is concerned. This means that some objects, say A and B, may more centrally belong to a given predicate P than C. What is important to note here is that the degree to which an object satisfies the application of a given predicate cannot be specified without introducing newer predicates. But the introduction of new predicates in their turn would require further recognition of similarity and difference whose degree cannot again be specified without introducing yet newer predicates. And this leads to infinite regress.[1] Therefore, a language cannot be constructed on the basis of 'basic recognition' alone.

Thus, correct understanding of sensation language makes it evident that postulation of sensations in the way in which Ayer requires is both unintelligible and superfluous. That the postulation of something private is not necessary from the point of view of language is made evident by showing that the logic of linguistic performance does not need it.

Now, suppose it is maintained that though the meaning of a sentence in a private language is dependent on public language, the truth of its statement can be,

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1. Hesse, Marry "Is There an Independent Observation Language", _The Nature and Function of Scientific Theories_, Vol. 4, ed. Colodny Univ. of Pittsburgh, 1970, p.40.

and is independent of it. Thus the privacy of private language may be said to rest on the claim that the truth or falsity of sense-datum statements can be known only to the person concerned. This position appears to have the advantage of not being open to the charge of unintelligibility due to absence of public or independent checking on the application of words. But the argument is not sound. It is clearly shown by Strawson in his article 'On Referring' that the truth or falsity of a sentence is the characteristic of the use of a sentence and not the sentence itself. Only a certain use of a sentence can be said to be true or false, the use being descriptive. A sentence can be used to express surprises, to warn, or used as an example. The "descriptive" use has meaning only in the content of actual linguistic performances where there are different language-games embodying other uses. But, in private language, where no use is possible, a sentence cannot have descriptive use either.

Furthermore, when it is claimed that a statement can be known to be true in private language only to the person concerned it is presupposed that we have adequate criteria of truth and that these criteria do not involve or refer to anything inter-subjective or public. The sense-data theory being a version of empiricism, the

criteria of truth adopted by it is correspondence with facts. Accordingly a statement S in private language will be true if and only if it corresponds with some facts f. But can one speak of 'facts' in a private language? To be able to say that something is a fact, one needs the facility to recognize in appropriate circumstances what is to be counted as a fact. But one can recognize whether or not something is a fact only so long as there are some criteria as regards what it is to be a fact. In other words there must be points of agreement concerning what is to count as fact and what is not. Hamlyn points out "what these facts are is something that we can raise questions about only from a point of view within what is agreed, and what provides the framework for intelligible discussions about what is fact and what is not."[1] So long as this background framework cannot be shown to be possible in private language, the talk of 'facts' in a private language simply does not make sense. Consequently, even the talk of 'truth' in a private language also would not make sense.

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1. Theory of Knowledge, Macmillan, 1970, p.141.

2.3 Conception of Knowledge

The general conception of knowledge underlying the sense-datum theory is:

> The necessary and sufficient conditions for knowing that something is the case are first that what one is said to know be true, secondly that one be sure of it and thirdly that one should have the right to be sure.1

It is worth mentioning here that the difference between knowing that something is the case and believing (or guessing) that something is the case is said to consist in the fact that whereas in former case the third condition mentioned above is satisfied, in the case of the later, it is not.

> ...(what is) the distinction between knowledge and true belief? How does...(a) man who knows what the results of the lottery will be differ from one who only makes a series of lucky guesses? The answer is that so far as the man himself is concerned, there need not be any difference. His procedure and his state of mind, when he is said to know what wil happen, may be exactly the same as when it is said that he is only guessing. The difference is to say that he knows is to concede to him the right to be sure, while to say that he is only guessing is to withhold it.2

Obviously, conceding to someone the right to be sure in the above context does not involve conceding a legal or moral right, for in the above context there are no such rights. Presumably, here having a right amounts to having good reasons or grounds for believing that something is the case. In other words, to be sure that something is

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1. The Problem of Knowledge, p.35.
2. Ibid, p.33.

the case is to believe that something is the case; and to have the right to be sure is to have good or valid reasons or grounds for believing that something is the case. Accordingly, 'A knows that p' would mean that P is true, that A believes that P, and that A has good reasons or grounds for believing that P.

But the above characterization of what it is to know that something is the case seems to be circular. The last of the three specified conditions which are said to constitute the necessary and sufficient conditions of knowledge cannot be operationally satisfied unless one already has some notion of knowledge. If 'having the right to be sure' means having good reasons or grounds for believing that something is the case, then in any given case for one to claim the right will presuppose one's knowledge of the criteria for identifying whether or not something does provide a basis to back one's belief.

However, the charge of circularity need not be pressed beyond bringing it to Ayer's attention, since it does not appear to be insurmountable. It is possible to subvert it by formulating the conditions differently. Moreover, our chief concern is to see whether or not Ayer succeeds in furnishing that by virtue of which one can be legitimately conceded 'the right to be sure'. Apparently,

the sort of grounds which may be supplied by common sense are not considered sufficient for believing that something is the case. Had they been sufficient, the sceptic would hardly be in a position to carry on with his doubt. At the same time, in order that the sceptic's position is not made incomprehensible, his search for grounds on which a knowledge claim could be founded with certainty must end somewhere. The sceptic, Ayer says, must not be crippled by either of two reasons if we are to utilize "his main service to philosophy."[1] Thus, as Strawson points out, on Ayer's interpretation of the sceptic, "one had better be ready with a special class of claims (convictions) which are not among the sceptic's targets, and do not need (or in a way do not need) any supporting bits of knowledge."[2]

Obviously, the sense-datum statements are, as we have seen, supposed to meet the sceptic's demand. In his last formulation of the sense-datum theory, Ayer does not accord sense-datum statements the privilege of being incorrigible, they are nevertheless such that it would not make sense to question the maker of them how he knows their truth. They are immune to sensible doubt. If the sceptic persists in doubting them too, he would rob "us of our certainty only by so defining it as to make it certain that it cannot be obtained."[3] His victory, then, is harmless and empty even though, "as usual his logic is impeccable.."[4]

1. Ibid, p.41
2. cf. Review of The Problem of Knowledge, Philosophy, Vol.XXXII, 1957, pp.303-304.

It seems that it is not the class of sense-datum statements which is tailor-made to suit the sceptic's demand; instead it is his demand which is being tailor-made to fit the sense-datum statements. The sense-datum statements are supposed to furnish premises[1] for our knowledge claims. But if they do function as premises, it is odd, to say the least, to hold that they cannot be questioned significantly, that to let them be questioned is to oblige the sceptic quite unnecessarily. However, if the sceptic could be manoeuvered to so formulate his requirement as to be satisfied by the sense-datum statements, why can't he, one is tempted to ask, be manoeuvered into accepting commonsense reasons or the naive realist's position so as to set his doubt at rest. Ayer has only claimed but not shown anywhere that the questions which the naive realist rejects are pertinent, and the distinctions which he refused to draw can in fact be drawn independent of the empiricist framework. It is interesting to note that just as Ayer finds no fault with the sceptic's logic, he finds no loopholes in the naive realist's position. Naive realism, according to him, is only "philosophically unenlightening", though not self-stultifying. The naive realist's position is neither refuted nor is it weakened. He is simply brushed aside as a philosophical philistine. But it is hardly an argument against him.

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1. The Problems of Knowledge, p.76.

In the empiricist scheme, including that of Ayer's, knowledge, contrary to the naive realist's conception, is considered inferrential in character. It is argued that knowledge involves a gap between what is claimed to be known and the evidence which is supposed to support it. In other words, a knowledge claim claims more that what is strictly warranted by its supporting evidence. As has been pointed out earlier, the argument from illusion plays a pivotal role in substantiating the gap-thesis. Since we are liable to be wrong in our perceptual claims, as is shown by non-veredical perceptions like illusion, perceptual judgment must be thought of as implying more than what is actually given. And, since perceptual knowledge constitutes the core of empirical knowledge, what is true of perceptual knowledge is true of empirical knowledge in general.

At this stage, one may legitimately join Hanson[1] to protest against the sense-datum theorist's attempt to explicate 'perceptual knowledge' in terms of what may or may not be involved in non-verdical perceptions. Ordinarily one should have expected that since it is veridical perceptions which properly constitute cases of perceptual knowledge or 'wear the trouser', to use Austin's phrase, an account of perceptual knowledge will be given in their terms. The preoccupation with what is or is not involved in non-veridical perception, or how we can go wrong in our observation seems to obscure Ayer's vision of what

is involved in veridical perceptions or when we are right about what we see.

The problem, which crucially affects Ayer's conception of knowledge, relates to the interpretation of illusion upon which the gap-thesis is founded. According to Ayer, illusions essentially involve misinterpretation of something basic or 'given' namely sense-data which are 'pure' and 'theory-free'. But is it a valid interpretation of illusions? If the difference between illusory and non-illusory, i.e. veridical, perception is only one of interpretation of the 'given' the hard core, which is common to both, then it would appear that in order to rectify one's illusory perception, one has simply to attend to one's sense-data more closely. For misinterpretation of the given could only take place because one is inattentive or not adequately attending to One's sense-data. But normally, it is only in the light of further experience that one comes to correct one's wrong perception. Most of the times what further experience is necessary is decided by what 'interpretation' we already have.

Further, if sense-data are indeed 'pure' and 'theory-free' as is claimed by Ayer, can they, then he amenable to any interpretation, correct or incorrect?

To interpret them is to set them in a theory. For Ayer, the possibility of illusion depends the possibility of wrong interpretation. Hanson rightly argues against such a view of illusion. According to him illusions are always on the line of what is familiar and normal to the perceiver. He says:

> ...deceptions proceed in terms of what is normal, ordinary. Because, the world is not a cluster of conjurer's tricks conjures can exist. Because the logic of 'seeing that' is an intimate part of the concept of seeing, we sometime rub our eyes at illusions.[1]

'Seeing as' and 'seeing that' are, as it were, two logical components of 'seeing'. To see anything is to see it as something. And, to see anything as something is to see that it has such and such features or character by virtue of which it is what it is seen to be. To see anything as a table is to see that there is some object which is hard, which has a certain shape and which occupies a certain place etc. One might of course be wrong. But what is noteworthy is the fact that identification of what one sees in terms of some categories is basic to perception. And, the categories themselves are acquired from prior experience. "Seeing that" reads knowledge into our seeing; it saves us from reidentifying everything that meets our eye... Seeing an object X is to see that it may behave in the ways we know X's do behave...[2] One cannot be deceived into

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1. Ibid, p.21.
2. Ibid, p.22.

perceiving a rope as a snake unless one already has some knowledge of what it is to be a snake, or what a snake looks like. Thus, to repeat, to see anything is to see it in certain connections or in a setting. Such connections are basic and essential features of both veridical as well as non-veridical perception; and they are not reducible to any sensations or sense-data.

Let us return to our consideration of sense-datum statements and their role in justifying perceptual claims. In order to specify the way in which statements about physical objects are claimed to be justified by statements about what physical objects seem to be, Ayer formulates two limiting cases wherein perception of what seems to be leads in one case to what does exist and in the other to what does not exist. The relation between what exists and what seems or appears is of an order different from that of a non logical relation between physical object statements and sense-data statements. The latter relation which is loose is accommodated within the framework of the limiting cases which are supposed to exemplify two sorts of circumstances in which there is a strict logical connection between "existence" and "appearance". Thus, according to the first limiting case, if a physical object X is supposed to be perceptible and if there are no circumstances whatever in which X would seem to be perceived then it

does not exist. And, according to the second case, if in what appears to be relevant setting, a physical object would always seem to be perceived no matter what further experiences were obtainable, then it exists.

The limiting cases are supposed to establish a relation between statements concerning the existence/non-existence of physical objects and statements concerning the way the physical objects seem in a manner that the latter provide evidence for the former. Obviously the limiting cases are meant to undermine the sceptic's challenge that under no circumstances we have the right to go from 'what seems' to 'what exists'. In the limiting cases, the connection between 'what seems' and 'what exists' is a logical one. To say that a relation is logical is to say that it holds in all possible circumstances. But it must be noted here that if "all possible circumstances" (or "relevant settings") are themselves not describable in terms of appearances, inferences from what appears to what exists would be unjustified since it would amount to accepting that the limiting cases themselves go beyond what is warranted, viz. the appearance. To avoid this difficulty one is forced to accept that "all possible circumstances" are specifiable in terms of appearances - an ontologically repulsive move.

The reason why even limiting cases do not save Ayer from the sceptic is that Ayer shares the sceptic's basic position that the publicity or public checkability depends upon the possibility of an inference from private experience to objective world. So long as one shares this position with the sceptic one can never hope to meet the sceptic's challenge. For in meeting it in the way Ayer does, one only establishes it further. Griffith points out:

> The strength of the sceptical doctrine lies in the fact that while the propriety of claims to perceive depends on the possibility of public checks, these public checks themselves are possible only if an inference from private experience to objective fact is justified; and this inference itself could only be justified by the use of public checks. If the sceptical doctrine is to be undermined it must be shown that this vicious circle is only apparent."1

One can come out of the vicious circle only if one accepts public checkability to be too basic to depend upon private experience. But if this is accepted then it would amount to disowning all the empiricist paraphernilia like sense-data and privacy etc.

To proceed further, the sense-datum statements in their justificatory role are said to be such that: (1) "While referring to sense-data is not necessarily a way of referring to physical object, referring to

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1. "Ayer on Perception", <u>Mind</u> 69 (1960), p.497.

physical objects is necessarily a way of referring to sense-data"[1]; (2) "We are to use the expression 'it seems that' as a means of signifying how things look, or feel, or otherwise appear irrespective of any judgement that we may be led to make about their physical existence, or of the degree of confidence with which one makes it."[2] In other words the experiences which sense-datum statements refer to are such that one is always aware of them while making a perceptual claim; they always accompany a perceptual claim, and they are accurately describable in a non-committal way, i.e. their description implies nothing whatever about any perceptual judgment which we make or are inclined to make on their strength or about the degree of confidence with which we make such judgments. But are these characterizations of sense-data and sense-datum statements mutually compatible? It is worth quoting what Srrawson has to say in this regard in his review of

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1. Philosophical Essays, p.104.

2. The Problem of Knowledge, p.102.

The Problem of Knowledge:

> ...there is no class of experiences which satisfies all three of these requirements... if the experiences are to be such that we cannot make a perceptual judgement without having them, then in many cases (I maintain) they cannot be accurately described without indicating what perceptual judgement we made, or were inclined to make, when we had them when we have such experiences as this, there may be no such inclination - ~~they~~ they are not such as must or do invariably accompany perceptual judgments. Finally, if we insist that there is something or other which invariably accompanies perceptual judgements, and which can be accurately described without any of the undesired implications, then there is no reason for denying that we may be totally unaware of it.1

Further, it is not at all intelligible how, Ayer can maintain the corrigibility of sense-datum statements and their theory independence in the same breath. The qustion of corrigibility can arise only in a theory-dependent activity. "What I experience now, I call red" may be non-committal as Ayer would like to convince us. But forthat very reason it is not a concrete proposition. Instead, it is only a fleeting definition. If p is a proposition then like any proposition it should involve space-time coordinates (if "proposition" is to be distinct from "sentence") which are publicly checkable. But then such a proposition either ceases to be private or will be unintelligible as a proposition. This is enough to show that corrigibility of sense-datum statements which must be made room for as Ayer himself recognizes, cannot go along with their being pure or theory independent.

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1. Philosophy, Vol.XXXII, 1957, pp.307-308

2.4 Conception of Science

Though we will discuss the empiricist conception of science (that is, the empiricist views regarding the logic of scientific method, theoretical entities, observation theory relation, nature of scientific theories and character of growth of scientific knowledge) in detail in Chapter 5, in this section, we shall consider the empiricist view of observation-theory relation implicit in Ayer's sense-datum theory. In the preceding section, we have seen how the limiting cases fail to logically guarantee the inference from "what seems" to "what exists". We will now examine whether or not Ayer succeeds in working out a justificationary relation between particular physical object statements and corresponding sense-datum statements. As has been pointed out earlier, he purports to work out such a relation using two methods viz., scientific method and Descriptive Analysis, the latter supplementing the former. According to the first method, the relation between physical object statements and sense-datum statements is inductive. That is to say, the former are the hypotheses about the latter. The former are theoretical statements and the latter are pure observation statements. This is made amply clear when Ayer says:

> (a) Speaking of physical objects is a way of interpreting our experience.[1]

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1. The Problem of Knowledge, p.132.

(b) In referring as we do to physical objects we are elaborating a theory with respect to the evidence of our senses.1

(c) The theory is richer than anything that could be yielded by an attempt to reformulate it at the sensory level. But this does not mean that it has any other supply of wealth than the phenomena over which it ranges.2

And, (d) ...commonsense provides the data for physical theory, just as commonsense view of the physical world is itself a theory with respect to the immediate data of perception.3

Clearly (d) amounts to saying that scientific knowledge is ultimately founded on the data supplied by sense-experience or sense-data. In (a) and (b) the relation between physical object statements and sense-datum statements and theoretical statements; whereas (c) and (d) characterize the nature of observation statements in science. The following are implied in (c) and (d):

(1) The observation statements are theory-free or non-committal in the sense that they presuppose nothing that is non-observational. If this implication is not accepted (c) gets annulled since it would then mean that the theory has supply of wealth other than the 'phenomena over which it ranges.'

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1. The Problems of Knowledge, p.132.

2. Ibid, p.132.

3. The Central Questions of Philosophy, 1973, Penguin, 1976, p.88.

(2) Observation statements are theory-free in the sense that the meaning of the terms occuring in them is determined only by either empirical situation or the 'given', 'immediately given' (or sense-data).

(3) Observation statements are theory free in the sense that they remain unaffected by the status of our theoretical knowledge. That is, because of their stability and invariance they are entitled to be theory-free.

Although theory independence of observation statements has been variously characterized in (1), (2) and (3), basic to these is the idea that observation-language is an independent category. We will, however, consider each characterization individually. But presently, let us briefly examine Ayer's contention that the relation between physical object statements and sense-data statements is analogous to the relation between a theoretical statement and observation statement in science. Observation in science is inter-subjective in the sense that the terms which occur in an observation statement are public. But the sense-data statements which are supposed to refer to the way things look to a perceiver are anything but inter-subjective since their truth is and can be known only to their maker. This radical difference between observation-statements of science and sense-data statements renders questionable the contention of an analogous relation between them.

Further, if "commonsense view of the physical world is itself a theory with respect to the immediate data of perception", we should be able to concive an alternative theory. In the absence of the possibility of an alternative which is prima facie on par with the theory accepted the acceptance or non-acceptance of a particular theory does not make sense. In other words, one must at least be able to conceive of an alternative. But in the case of perception of physical objects one does not have an alternative to what is regarded as "commonsense view". On this count too the attempt to treat the relation between physical object statements and sense-datum statements analogous to the relation between theory and observation statements is unwarranted.

More than anything else, the adequacy of Ayer's claim of the inductive relation between physical object statements and sense-data statements depends upon the tenability of his conceptions of the observation statements and theory-observation relation. The implications (1, 2 and 3) which follow from (c) and (d) are relevant in this context since they characterize observation statements as well as the relation between theory and observation. We shall therefore consider in what follows whether or not these implications can be sustained. In case these implications are found indefensible, the justificationary scheme proposed by Ayer is also thrown overboard.

Consider the first implication. If the fabric of a particular observation statement is shown to be pervaded by various factors which themselves are not reducible or even traceable to observation then it cannot be regarded theory-free or non-committal. The observation statements in science are made against the background of the following factors:

(a) The problem with a set of possible solutions.

(b) Scientific notation or formalism.

(c) Ontological commitments of the language in which observation statements are made.

(d) Prior knowledge needed for observation.

a) The most important factor that decides something to be a fact is the problem or purpose at hand. E.H. Carr in his What is History? points out the various ways in which a thing of past gets "proposed for membership of the select club of historical facts"[1] For example, suppose in a particular place some disturbances takes place and it is recorded by an eye-witness in a diary. After a hundred years if someone just looks at it, it would simply be a diary for him, even if the man is a historian. But if he wants to make a study of the disturbance that took place, the diary then becomes a source of <u>facts.</u> It is the interests and purposes that make something

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1. <u>What is History</u>, Pelican, 1964, p.12.

a fact. In other words there are no pure, brute facts lying outside. Facts are partly created so as to be relevant. Observations are to be made in accordance with the demands of the problem at hand so as to ensure its relevance. Similarly, the nature of a given problem itself determines what would count as relevant fact or what sort of observation would be relevant. Popper rightly points out that "before we can collect data, our interest in data of a certain kind must be aroused: the problem always comes first."[1]

b) Apart from the interest and purposes, the language of formalism or notation also determines our observation. For example, in 1638 Galileo formed the concept of constant acceleration using geometrical notation. It is worth noting here that Galileo and his opponent Descartes shared the belief in the sanctity of geometrical notation, though Galileo gave it up later. However, in the beginning Galileo tried to formulate the concept of constant acceleration without taking into account time-variation. But the sequence of moments could not be charted on triangles against sequences of space. Even though he was aware of time-variation, it did not become part of Galileo's data. Blinded by notation, he transferred to space what actually belonged to time. The notation forced him to plot velocities against distance and not time. This practical

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1. The Poverty of Historicism, Routledge and Kegan Paul, London 1957 p.121.

difficulty, which was so enormous that it took several years of conscious effort from Galileo to overcome it, points to the myth of pure observation-statements unimpeded by contigencies of a particular sort of notation.

c) Observation statements are inseparable from the ontological commitments of the language in which they are made. Feyerabend shows how an observation language employing natural numbers commits itself to a particular sort of ontology.[1] The language of numbers assumes that the objects are discrete and that the result of our counting is independent of the order in which we proceed. If the ontological commitment of a language comes to be questioned, no observation statements can be made using that language. It should be noted that the ontological commitment of a language cannot itself be proved or disproved within that language.

d) Further, most observations in science require effort and training. Without necessary effort and training not only the complexity of the observational situation might be missed but also a description might turn out to be useless for a given purpose. What is more, the intended observation might be impossible without proper training and effort. This has been very well brought in Herschel's

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1. "An Attempt At a Realistic Interpretation of Experience", <u>Proceedings of Aristotlian Society</u>, Vol.LVIII(1958-59),p.148.

following illustration:

> I will prepare the apparatus, and put you in such a position that (Fraunhofer's dark lines) shall be visible, and yet you shall look for them and not find them, after which, while you remain in the same position, I will instruct you <u>how to see them</u>, and you shall see them and not merely wonder you did not see them before, but you shall find it impossible to look at the spectrum without seeing them.1

This means that the significant observations can be made only when one is already conceptually aquipped.

The above discussion should suffice to show the untenability of the first implication which asserts the theory-independence of observation statements.

Implication (2) purports to establish the theory-independence of observation statements on the basis of a certain interpretation of observation language (or the meaning of observation terms) which is supposed to be solely determined by (i) empirical situation or (ii)immediately given or phenomenological experience. Let us oonsider these alternatives.

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1. Quoted by N.R. Hanson in <u>Patterns of Discovery</u>, p.184.

(i) Though observation terms are learnt in empirical situations, as learning of language proceeds these observation predicates enter general statements which are 'law-like' and hence are accepted to be true. For example, "Lemons are sour". "Sugar is sweet" etc. Such general statements enable us to identify and reidentify proper occasion for the use of a given predicate by means of physical similarity. Suppose L is a law incorporating predicates P_1 and P_2. If L undergoes change or is replaced by another law, the meaning P_1 or P_2 also undergoes change in the sense that their range of applicability changes. Furthermore, the changes in a law depend upon changes needed by the totality of the network of laws. Mary Hesse points out,

> That any empirical law may be abandoned in the face of counter-examples trite, but it becomes less trite when the functioning of every predicate is found to depend essentially on some laws or other and when it is also the case that any "correct" situation of application-<u>even that in terms of which the term was originally introduced</u>- may become incorrect in order to preserve a system of laws and other applications.1

Thus the role of laws in determining the meaning of one observation terms is no less relevant than that of empirical situations. The demand of intersubjectivity,

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1. "Is There an Independent Observation Language?". <u>The Nature and Function of Scientific Theories</u>, Vol.4 (ed) R.G. Colodny, Univ. of Pittsburgh Press, 1970, p.42.

which must be met by observation language if scientific knowledge is to be possible, can be satisfied only if such laws are possible. For, to say that the observation terms are intersubjective is to say that the correctness of the application of observation predicates in a given situation must in principle be testable intersubjectively, i.e. disagreements regarding the application of an observation predicate must be publicly resolved.

ii) The second alternative according to which it is the immediately given that determines the interpretation or meaning of observation predicates, is the favourite of most of the empiricists since it has the promise of directly relating the insecure theoretical knowledge to secureprivate experience.

Let us suppose we have an observation sentence S and an "immediately given" phenomenon P. We are told that the interpretation of S is solely determined by P. Let us refer to the proposed relation between S and P as "the relation of phenomenological adequacy"[1] or that of "fitting", or p' in short. The observer must be aware of not only P but also P'. But to be aware of P' is to be aware of 'p' fitting S. And, to be aware of 'P' fitting S' is to be aware of P", which means to be aware of 'P" fitting S"' This can go on indedinitely leading finally to the absurd conclusion that the observer

1. This term and the following argument is taken from Feyeraband, op. cit. p.155.

can never really observe. Therefore, the question of meaning cannot be decided by introspection or attendance to what is given.

Further, as Feyerabend points out, the fact that certain signs which have lost their original interpretation are no more applied to the phenomenon or fit the phenomenon which previously evoked their acceptance, shows that it is not the fitting that determines their interpretation but it is their interpretation that is the presupposition of their "fitting".[1]

Thus on neither grounds, empirical situation or 'phenomenal given', the interpretation of the observation language can be shown to be opaque to the considerations which are non-observational.

The above discussion shows that the relation between sense-data statements and the statements concerning physical objects, proposed by Ayer, can hardly be regarded to exemplify scientific method. Therefore, Ayer fails to provide a satisfactory model for justifying our perceptual claims concerning physical objects in terms of sensedata statements. As we know, Ayer's sense-datum theory, true to its empiricist loyalties, confers only a secondary or parasitic status, ontologically speaking. But, in its failure to counter the challenge of scepticism

1. Ibid, p.156.

engendered and fostered by the theory itself, it failed to establish even the dependent or parasitic reality of the physical objects, the entities supposed to figure in the superstructure of knowledge. The theory, therefore, not only remains non-realist par excellence, but also stands as a grand failure in the face of a challenge which is but its own creation.

CHAPTER 3

NON-REALIST THEORIES OF PERCEPTION (CONTINUED)

In the preceding chapter we considered one variety of the architectonic conception of perceptual knowledge which is shared by both formalist theories and grand theories alike. In this chapter we will examine some other forms of formalist epistemology proposed in the recent past, such as

1. 'The Evidential theory' of Chisholm.
2. 'The Causal theory of perception' of Grice
3. 'The Causal theory of perception' of Maxwell
4. 'Pragmatic Analysis' or 'Rational Reconstructionism' of Goodman.

The common theme of all these theories is that perceptual knowledge involves a judgemental jump from some basic forms of awareness to the perceptual knowledge claims made. Because of this jump the perceptual knowledge needs philosophical justification although one of these theories viz. Maxwell's Causal theory of perception eventually shatters all the hopes of a successful justification. But the others who 'see' in perception the presence of some logically distinguishable basics on which the super-structure of perceptual knowledge comes to be built hope to meet this need in various ways. Of course, the philosophers like Grice do not explicitly offer any justification. However, if so, Grice's defence of the tenability of the idea of sense-data and his attempt to purify 'looks' and 'appears' statements from the unwanted

elements which ordinary discourse imposes on them can be appreciated only in the context of facilitating a justificationary scheme. The architectonic conception of knowledge and the consequent conception of knowledge as needing a justification, obvious or soft-peddled are common to Chisholm, Grice and Goodman. All these theories including that of Maxwell stand in opposition to the realist theories of perception accordingto which perceptual knowledge involves neither a jump, nor logically distinguishable 'basics'. Whereas for Ayer, Chisholm, Grice and Goodman justification is not only necessary but also possible, for Maxwell it is not possible though necessary. In what follows we shall consider each one of the four formalist theories individually.

3.1 The Evidential Theory

Chisholm in his Theory of Knowledge attempts to bridge the gap between the propositions about one's own mental states which he regards as directly evident and propositions about physical objects which are said to be *indirectly* evident.

In the above context Chisholm considers and rejects various attempts to define 'knowledge' in terms of 'belief' 'observation' and/or 'probability' etc. Likewise he rejects Austin's strategy of dealing with the problem of knowledge

by interpreting first person knowledge claims as performatives. He defines knowledge in terms of the locution: "S known at t that h". The truth conditions of this locution are said to be "(1) S believes h at t; (2) h is true; and (3) h is evident at t for S".[1] It may be noted here that whereas for Ayer the third condition would be like "S has the right to be sure that h at t" for Chisholm it is "h is evident at t for S." The concept of "being evident" is crucial here because the distinction between the basics and the superstructure ultimately rests on it. The evidential character of the basic propositions in whose terms justification of perceptual claims is supposed to be carried on is of a special sort. He says, "certain things that we know to be true, we would be willing to call evident."[2] Since the question of justification can be continuously asked at all levels we have to find a way to avoid circularity and infinite regress. To do this we have to find a "proper stopping place."[3] "The proper stopping place" is reached when "we have encountered what is directly evident".[4] Thus, after defining various epistemic terms, Chisholm introduces a distinction between directly evident and indirectly evident. A proposition h is said to be evident for a subject S provided

> "(1) that h is reasonable for S and
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> (2) that there is no proposition; such that it is more reasonable for S to believe i than it is for him to believe h"[5]

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1. Theory of Knowledge, Prentice Hall 1966 , p.23.
2. Ibid, p.24.
3. Ibid, p.26.
4. Ibid, p.27.

Further, h is said to be directly evident to S if "(1) that it makes no sense to say of him that he knows the proposition to be true and (2) that the proposition is evidence for him of something else.[1] If a proposition is evident but not directly it is indirectly evident. The directly evident statements which are relevant from the point of view of perception are the statements which involve the descriptive use of 'appear' and 'seem'.[2] The character of these directly evident propositions is made clear in his characterisation of them as involving a "non-propositional" sense of the perceptual verb 'see'.[3] It is non-propositional because it makes no sense to say that the subject knows that the utterance involving such a use of 'see' to be true. He defines the non-propositional and basic sense of 'S sees X' as meaning that "as a consequence of X a proper visual stimulus of S, S senses in a way that it functionally dependent upon the stimulus energy produced in by X"[4] and "S takes X to have some characteristic."[5]

Thus the directly evident propositions involving 'appear' or 'seem' or non-propositional use of 'see' serve as "proper stopping place".

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1. Ibid, p.30.
2. Ibid, p.32.
3. Perceiving: A Philosophical Study, Ithaca. N.Y. Cornell Univ. Press, 1957, Chapter 10.
4. Ibid, p.149.
5. Ibid, p.150.

Further Chisholm argues against the contention of Ryle and Austin that 'seem' and 'appear' do not have phenomenological or descriptive use and that 'see' has only achievement sense. For Ryle and Austin 'seem' and 'appear' are used to express doubt or denial and not to describe any mental state, and 'see' has only an achievement sense. and thus it cannot be used in non-propositional sense as desired by Chisholm. Chisholm attempts to counter both the contentions. In the statement "Friday saw the ship better than Crusoe being younger and uncivilized and yet did not see the ship", the former "see" does not have "achievement use". Consider the proposition "this appears white, actually it is not." The statement illustrates, according to Chisholm, two points overlooked by many contemporary philosophers; (1) "...in such a statement 'appear' cannot have the hedging use just referred to, for if it did, the statement would be incongruous (which it is not). The second part ...(of the above statement) would provide a guarantee which the first part ...withholds,"[1] And, (2) "...the descriptive, phenomenological use of 'appear' is not restricted to the description of <u>illusory</u> experiences."[2]

But all that one can know is not restricted to what is directly evident. The "truth of facts" that are not directly evident but are known to be considered as

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1. <u>Theory of Knowledge</u>, p.31

2. Ibid, pp, 31-32.

indirectly evident. Statements regarding past, external things, other people's minds etc. come under this category. How do we justify them in terms of the directly evident? We can start with the traditional assumption that what is indirectly evident is based upon or known through what is directly evident - an assumption which implies that "...there are certain epistemic principles or rules of evidence which, in application to what is directly evident, will yield whatever is indirectly evident."[1] Chisholm argues that these principles are neither inductive nor deductive. He, in order to indicate a possible theory of empirical evidence, modifies three theses of Carneades so as to incorporate three epistemic concepts - 'evident', 'reasonable' and 'acceptable'. But three theses are stated by Chisholm as follows: (1) "if a man has a perception of something having a property F, then, for him, the proposition that there __is__ something having that property F is acceptable".[2] Further, since some propositions concur and reinforce one anther, (2) "Acceptable propositions that stand in this relation of concurrence are more reasonable than those that do not."[3] And finally (3) 'Concurrent propositions that survive such "close scrutiny and tests" are more reasonable than those that do not."[4]

Chisholm conducts a "critique of cogency" countenancing the directly evident character of one's "self-presenting states"; and lays down nine epistemic principles of which

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1. Ibid, p.38.
2. Ibid, p.41.
3. Ibid, p.42.

three pertain to perception, and the remaining six are concerned with memory and experimental inference. The principles relating to perception are: (1) "If there is a "self-presenting state" such that S is in that state, then it is evident to S that he is in that state."[1] (2) "If S believes that he perceives something to have a certain property F, then the proposition that he does not perceive something to be F, as well as the proposition that there is something that is F, is one that is reasonable for S."[2] This principle, according to Chisholm, tells us that "believing that one perceives" is a source of reasonable belief". We are affirming, therefore, a version of empiricism".[3] (3) "If there is a certain sensible characteristic F such that S believes that he perceives something to be F, then it is evident to S that he is perceiving something to have that characteristic F, and also that there is something that is F."[4] The third principle, thus, concerns the occasions on which S would justify a knowledge claim by reference to the belief that he perceives something to have some sensible characteristic F.

We are further told to withhold any unqualified application of the term 'evident' to the perceptions of physical objects. The reason is that a non-veridical perception might also at times satisfy the above tests and

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1. Ibid, p.44.
2. Ibid, p.45.
3. Ibid, p.45.

criteria. If we don't qualify them, we must be prepared to say that some propositionsare both evident and false. But, then it poses a dilemma: either we say that no proposition can be both evident and false, and thus restrict ourselves to what is directly evident; or accept that propositions are false though evident. The second alternative is the lesser of the evils for Chisholm.[1] It means, then, that we cannot assume that every proposition is true. "This conclusion is sometimes expressed paradoxically by saying that knowledge involves an element of 'animal faith'."[2] Thus, Chisholm arrives at what he calls a "critical cognitivist view".[3] It aims to work out conditions under which the state of "thinking that one perceives" will confer evidence or confer reasonableness upon proposition about external things.[4]

To any one familar with the history of empiricism and the cosmetic attempts of modern empiricists to hide basic corruptions in their theory it would be obvious that Chisholm's view is basically empiricist in character. Something being "directly evident" has definite overtone of being indubitable and 'pure observation' since directly evident propositions which describe only "phenomenological experience", are said to be infalliable. It does not make sense to question how the knower knows them.[5] In other words

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1. Ibid, p.49.
2. Ibid, p.49.
3. Ibid, p.66.
4. Ibid, p.66.
5. Ibid, p.28.

directly evident propositions are similar to sense-datum propositions. We have seen how empiricists fail to justify the introduction of terms like sense-data and private language independent of their epistemological assumptions. Chisholm's account is also afflicted with a similar failure with regard to the introduction of terms like 'directly evident' and 'indirectly evident' etc. Unless the assumption that knowledge needs to be justified is granted, there seems to be no occasion for such innovations. Chisholm provides no independent argument for such an assumption. He points out that the questions, "what justification" do you have for thinking this thing as something that is true?" ...need not be taken to express any doubts, or to indicate any attitude of scepticism."[2] Such questions are not challenges. They are "designed only to elicit information."[3] But the philosophical presuppositions which need to be defended are seminal in our search for information. It is important to ask here "what is the purpose of seeking information which such questions are designed to elicit?" Further, the purposes, if there are any, themselves have to be critically viewed - whether they are forced on us or they are such that they arise from the presuppositions of the theory itself. If one does not consider these issues to have any significance, then Chisholm cannot really question what Leonard Nelson says: "If one asks whether one possesses objectively valid cognitions at all, one thereby presupposes that the objectivity of cognition

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1. Ibid, p.24.
2. Ibid, p.25.

is questionable at first."[1]

Chisholm hopes to prove that knowledge is intentional* by refuting Austin's interpretation of "I know". But refutation of Austin's position in this regard does not amount to a refutation of all versions of dispositional/non-intentional view of epistemic terms, because Austin's interpretation is only one of them. Since Chisholm has failed to show the untenability of non-intentional interpreation of 'knowledge', he has no grounds to consider perception to be basically intentional in character if at all perception is to be a part of wider framework of knowledge in general. The examples he has given no doubt succeed in showing that there is a "non-achievement" sense of "see". But it does not show that the statements involving such a use can be used to justify our knowledge-claims about physical objects. In other words, since their epistemological priority is not established, they cannot serve as terms of justification of perceptual knowledge. Further, we have no criteria to distinguish between statements involving intentional concepts and those that do not. Criteria like "non-existence", and "referential opacity or "non-substitutivity" have been proved to be inadequate. Thus we have no basis to say that there are two logically distinct set of propositions such that one can be used to justify the other.

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1. Socratic Method and Critical Philosophy; Selected Essays Tr: T.K. Brown III Dover, New York, 1965, p.190

* That for Chisholm knowledge is intentional is clear from the fact that in his account it involves 'belief'. Beliefs according to him are such that they can be accepted or rejected; and since "to accept" is an intention verb,

Therefore, the failure to prove the logical autonomy and epistemological primacy of the statements involving the intentional use of perceptual terms makes the whole attempt of working out a theory of justification of perceptual knowledge fruitless.

We can now see how Chisholm fails to avoid the empricist's paradox "more philosophical austerity, more philosophical bankcruptcy"- a tragedy which again is reminiscent of his empiricist roots. In a thorough-going empiricist vein he speaks of his "directly evident propositions" to be "premises,"[1] implying thereby that knowledge involves a jump which needs justification. But a thorough justification, cannot be achieved, for knowledge ultimately involves according to him an irrational element or what he calls "animal faith".[2] It is reminiscent of not only the failure of Ayer on the face of Sceptic's attack but also of Hume who admits that we have no recourse but to fall back on our natural instincts, that "reason is and only to be, the slave of the passions and can never pretend to any other office than to serve and obey them." Thus it is clear that empiricism, whether in its traditional or logical-linguistic version cannot avoid irrationalism. Bruce Aune rightly says:

> The paradox of empiricism is ...as old as Hume. We think of the empiricist as spurning the claims of the heart and as offering a hard-headed ideal for acceptable knowledge-but we actually find him

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1. Ibid, p.61
2. Ibid, p.49; also Perceiving: A Philosophical Study, Chapters 7, 14, 38.

> operating on assumptions he cannot, on his official principles, defend. Yet we have to trust blind natural instinct in holding to the soundness of our faculties; are we really in a better or a tougher position than the old-fashion rationalist who trusts his intuition or natural light? It is hard to see how we can answer <u>this</u> question with a confident "yes".[1]

3.2 The Causal Theory of Perception: Linguistic

We have seen in the preceding section that Evidential theory as propounded by Chisholm is not substantially different from the sense-datum theory. The basic statements which are supposed to constitute the ultimate terms of justification have similar features in both the theories. In this section, we will consider the Causal theory of perception, which by way of its philosophical inspiration is a progeny of the classical Representative theory. There are two versions of the Causal theory (henceforth referred to as CTP) which underlie its classical as well as modern form, namely,

> a version, of the causal theory of perception from which it follows that what is to be 'causally accounted for by the existence of the material object is a 'state of affairs' or 'circumstances' (reported by certain 'sense-datum statements') involved by the perception of the material object and a version of the Causal theory of perception which holds that it is the perception of material object which it is to be 'causally accounted for' by the existence of the material object.2

The basic position underlying both the versions of CTP is that there is a causal connection involved in our perceptual

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1. "The Paradox of Empiricism" <u>Meta Philosophy</u>, Vol.1 No.2, p.138.
2. White, Alan "The Causal Theory of Perception" <u>The Philosophy of Perception</u> ed: Warnock, G.J. Oxford Univ. Press, 1967, p.113.

knowledge. Various epistemological problems like justification of perceptual knowledge are to be resolved within the scheme of the causal relation. However, the two versions differ in their explication of the nature of this connection. The CTP in any of its forms and versions, thus, stands directly opposed to common-sense realism which, according to CTP is too naive to recognise the causal element involved in our perceptual knowledge. It is by overlooking the causal element in perceptual knowledge that the alleged directness in perception of physical objects can be made for. The starting point of the argument against commonsense realism is supposed to be provided, as we have seen in Chapter 2 by what are considered to be the recalcitrant phenomena namely, illusions and hallucinations. Such phenomena lead to a philosophical theory according to which:

> "the elucidation of the notion of perceiving a material object will include some reference to the role of the material object perceived in the causal ancestry of the perception or of the sense-impression or sense-datum involved in perception."[1]

In recent times the CTP appears in two different garbs which can be characterized as linguistic and empirical.

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1. Grice H.P. "The Causal Theory of Perception" The Philosophy of Perception (ed) Warnock G.J. Oxford Univ. Press, 1967 reprinted in 1968, p.85.

The difference between them is only one of genesis. The linguistic version is prompted by the considerations of the conceptual aspects of perceptual propositions; whereas the other version is inspired by the empirical knowledge regarding both external world and psycho-neurological apparatus of perception. The two versions - linguistic and empirical - are represented in the dissertation by H.P. Grice and Grover Maxwell respectively. In this section we shall discuss Grice's account of CTP.

The quintessence of Grice's position can be expressed in his own words:

> (1) It is true that X perceives M if, and only if, some present-tense sense-datum statement is true of X which reports a state of affairs for which M, in way to be indicated by example, is causally responsible, and (2) a claim on the part of X to perceive M, if it needs to be justified at all, is justified by showing that the existence of M is required if the circumstances reported by certain true sense-datum statements, some of which may be about persons other than X, are to be causally accounted for.[1]

Implicit in this is the contention that perceiving a material object involves having a sense-datum which is to be 'causally accounted for' by the existence of material object perceived. Clearly, a satisfactory explication of the notion of sense-datum is of crucial importance in sustaining the above position. Acknowledging that "attempts to indicate or demonstrate the existence of special objects called sense-data have all failed",

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1. Ibid, p.112.

Grice argues that "the expression 'sense-datum' can (and should) be introduced as a technical term; its use would be explicitly defined by reference to such supposedly standard locutions as 'so-and-so looks ∅ (e.g. blue) to me', 'It looks (feels) to me as if there were a ∅ so-and-so', 'I seem to see something ∅ and so on."[1] Thus, expressions like 'looks', 'feels', 'seems' etc., are considered by Grice as likely candidates for the key role in this enterprise, i.e. of formulating an explicit definition of sense-datum. Grice does not consider it necessary to provide the details of how such a definition is to be actually formulated, but he is careful enough to warn that in carrying this programme out, one will have to cautiously handle the subtle differences of meaning between these expressions.

In this connection Grice considers in detail an objection to his procedure which if sustained would have serious repurcussions to his scheme. The objection in the words of Grice runs as follows:

> When someone makes such a remark as 'It looks red to me' a certain implication is carried, an implication which is disjunctive in form. It is implied either that the object referred to is known or believed by the speaker not to be red, or that it has been denied by someone else to be red, or that the speaker is doubtful whether it is red or that someone else has expressed doubt whether it is red, or that the situation is such that though no doubt has actually been expressed and do denial has actually been made, some person or other might feel inclined towards denial or doubt if he were to address himself to the question whether the object is actualy red.2

1. Ibid, p.87.

2. Ibid, pp.87-88.

Now, if it is not possible to disentangle the said D-or-D implication from the 'look' or 'seem' statements then it would be impossible to introduce in any manner the sense-datum statements. Therefore, it is important for Grice to meet this objection. Grice, therefore, undertakes a careful study of the notion of implication with reference to certain concepts such as presupposition, vehicle of implication, detachability and cancellability etc. He shows by a detailed and well-knit analysis that 'looks' can be used in a certain sense without being entangled with doubt-or-denial implication.

It is not relevant for our purpose to examine how Grice refutes his opponents in order to establish that on a certain interpretation of look-statements D-or-D implication does not hold. We shall not go into his arguments in this connection. Instead, we shall focus our attention on his actual thesis which is supposed to provide an adequate interpretation of ordinary perceptual claims. According to Grice, his theory does not purport to state the sufficient conditions of its being the case that a perceiver X perceives M. He finds that "a more promising direction for the CTP to take is to formulate the required restriction between in terms of the way in which a perceived object contributes towards the occurrence of the sense-impression."[1]

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1. Ibid, pp.104-105.

The question regarding the exact nature of the way impressions occur can be left to thespecialists.[1] As against most causal theorists for whom the purpose of CTP is to elucidate the legitimate method of arguing from appearance to reality, Grice looks upon the "causal analysis of perceiving as something to be judged primarily on its intrinsic merits and not merely as a part of a solution to a prior epistemological problem..."[2] In what follows we shall critically consider to what extent the theory succeeds in accomplishing its programme.

For the success of CTP Grice needs to establish not only the possibility of sense-data statements but also their necessity. Even if it is proved that there is a way of constructing 'look' statements without D-or-D implication, it is only one of theconditions for arriving at sense-data statements. But from this it does not follow that we have succeeded in showing that "perception of material objects involves having sense-data." As Alan White points out, "Grice's argument...provides not the slightest evidence for the truth of what he admits is a claim which the causal theory of perception must necessarily make, namely that 'perceiving a material object involves having or sensing a sense-datum."[3]

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1. Ibid, p.105.
2. Ibid, p.109.
3. Ibid, p.116.

The CTP appears to be intrinsically incapable of working out a justificationary analysis of perceptual propositions in terms of sense-datum statements. Nowhere sense-datum statements are shown to be least dubitable or indubitable. Their epistomological priority cannot be established, since epistemological priority is defined in terms of indubitability or least dubitability. Actually, as the CTP proceeds only the contrary gets established. Ultimately, the physical object statements which refer to the causes (material objects) come to be considered as prior to the statements concerning sense-data which refer to the effects.

Moreover, the sense-datum statements have an ambivalent character of CTP. They are logically prior to physical object statements in the sense that whereas a physical object statement is supposed to be accompanied by sense-data statements since perceiving a material object involves having or sensing a sense-datum, the latter does not involve the former. But at the same time the sense-data statements are posterior to the physical object statements since cause is always (logically) prior to the effect.[1]

We are told that the charge against CTP that it fails to overcome the agnostic predicament resulting from the inability of the causal theorist to justify causal inference from experience to the public objects is baseless because

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1. cf. Mario Bunge, Causality, Harward Univ. Press, p.39.

the causal connection between an experience of sense-datum and the existence of physical objects is non-contingent, according to Grice. In his view theargument against the causal theory mistakenly assumes this to be a contingent connection. But, Grice argues that "the non-contingent character of the proposition that the presence of a red (or round) object tends to make it look to particular people as if there were something red (or round) before them does not, of course, in itself preclude the particular fact that it looks to me as if there were something red before me from being explained by the presence of a particular red object."[1] Thus the causal connection as construed in CTP can, according to Grice, be used to justify particular physical object propositions. The point, however, is that granting that the existence of an object X does furnish explanation of its looking to someone as if there were an X, it does not follow that the explanation furnished is a causal explanation. Further, can we seek for a veridical perception an explanation in terms of material object such that explanation is causal? If the explanation is for justifying a particular perceptual claim, then it cannot be a causal explanation. For, a cause cannot be given for justification.

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1. op. cit. pp. 111-112.

One may note here that explanation in Grice's view is very similar to Ayer's in the following senses. 1) Both explicate the relation between physical object statements and sense-datum statements by using two models which, they suppose, are used in science. In the case of Ayer it is Inductive model, and the in the case of Grice it is the causal model. 2) They do not want to incorporate in their schemes the contingent character of the relation between physical object statement and sense-datum statements. Ayer tries to compensate for the congingent character of the inductive relation by supplementing scientific method with Descriptive Analysis, whereas Grice treats causal relation between physical object statements and sense-datum statements as a non-contingent relation.

We have seen in the previous chapter how Ayer misconstrues the nature of observation and observation-theory relation. Grice too is equally guity of illegitimate extrapolation of the concept of cause in working out an epistemological relation between physical object statements and sense-data statements. The conception of causal relation that Grice construes here can be characterized as chain-conception or what Hanson describes as 'geneological-tree account.'[1] In this context it is significant that Grice himself uses the phrase "causal ancestry" in his characterization of what he considers the standard version of CTP as quoted earlier. It is however

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1. Patterns of Discovery, p.51.

questionable whether the chain-conception of causality holds ground in science where it is supposed to apply ideally.

The geneological account neglects the brute fact that in science one cannot speak of causal relation without a theoretical background. One cannot speak of a causal connection between two events, say, one ball hitting another and the second moving, unless we are already familiar with, for example, the dynamics of elastic bodies involved. As Bridgeman points out, "we do not have a simple event A causally connected with a simple event B but the whole background of the system in which the events occur is included in the concept, and is a vital part of it."[1] An explanation of event E_1 is possible when we can put it into a pattern of concepts about other events E_2 and E_3. Let us note that the Grice's sense-data statemants are such that they cannot enter into any pattern of concepts without loosing their private character. Therefore, to speak of cause in their case is a violation of the canons that guide the use of cause in the context of science.

Furthermore, the geneological or chain conception of causality grossly neglects the fact that in science there is no absolute or first cause or absolute or final effect. The distinction between observation-statements and the statements which are explanatory is totally contextual.

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1. Quoted by Hanson, N.R. Patterns of Discovery, p.50.

The sense-data are "effects" in a context-free sense. That is, they cannot be construed to be causes of anything else. This makes the talk of causal explanation in the case of sense-data anamolous unless we are ready to be inconsistent in the use of 'cause' in the context of science and in the context of the relation between sense-experience and physical objects.

Further, both observation statement and a statement serving as a causal explanation in science are expressed in a public language, whereas a sense-datum statement and a physical object statement are required to be in two different languages, the latter in public, the former in private. If sense datum statement is pushed into public language it looses its privacy and the desired neutral character.

Finally, it is doubtful whether the idea of a non-contingent connection between physical object statements and sense-datum statements can be sustained. Unfortunately Grice does not elaborate the nature of the non-contingent relation in the context of the proposition that the presence of a red object tends to make it look to particular people as if there were something red before them. The minimum requirement for a non-contingent relation to hold between looks of an object and the presence of an object is that the related statements in which "looks" and "experience" appear are to be of the same kind. The same sort of considerations would show them to be true.[1] But this is not so in the case of sense-datum

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1. Hamlyn: <u>Theory of Knowledge</u>, p.64.

statements and physical object statements. In the case of former which are supposed to be private, it is only the person concerned who can know whether the truth-conditions are satisfied whereas in the case of the latter it is not so. Hence, one wonders how one can speak of a non-contingent causal relation between them. If such a non-contingent relation cannot be established CTP fails to escape from an agonostic predicament.

3.3 The Causal Theory of Perception: Empirical

The empirical version of CTP derives its strength from the recent findings in science particularly in the areas of neuro-physiology and psycho-physiology. Like its linguistic version the empirical version too rejects common sense realism. Among its protogonists are thinkers like Mandelbaum, Yolton, J.R. Smythies, Lord Brain, Stephen Pepper, Hirst and others who high-light different aspects of the representationalist theory. The different characteristics of the empirical version of CTP emphasised by its various proponents need not be accounted in detail here, since our interest is only in its general approach to the problem at hand. For this purpose a consideration of Maxwell's formulation, in our view, will suffice. Therefore, we shall confine our discussion to an examination of Maxwell's views in this section.

In order to give a reasonably complete account of Maxwell's formulation, we will concentrate on two of his papers, namely (1) "Scientific Methodology and Causal Theory of Perception"[1]; (2) Theories, Perception and Structural Realism."[2]

The quintessence of Maxwell's position in his own words is as follows:

> If our current theories in physics, neurophysiology, and psychophysiology are at close to the truth or even if they are at all headed in the right direction, then a complete description, including a complete causal account, of everything that is involved in perception except the private experience itself would mention only such entities as submicroscopic particles, electro-magnetic quanta etc. ... At no point in the the entire, complete description and causal explanation is there mention of any first order property such as colours .... we must conclude that colours are exemplified onlyin our private experiences and that there is no reason to believe that they are ever properties of the material objects of the external environment. What holds for colours must also be true for all of the first order properties that we perceive directly... (and) our knowledge of the external realm is limited to its structural aspects. 3

Maxwell rejects the contentions that (1) the dispute between the instrumentalist and the realist theories regarding scientific entities is only verbal, (2) philosophy is a purely

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1. Philosophy of Scince, Vol.3 eds. Lakatos I and Musgrave A. North Holland Pub Co. 1968, pp.148-160.
2. The Nature and Function of Scientific Theories ed: Colodny; Vol.4, Univ. of Pittsburgh, 1970.
3. Theories Perception and Structural Realism" op. cit. p.19.

logical or conceptual inquiry and hence findings of science are irrelevant to its problems, and (3) that the instrumentalist view of scientific entities, according to which given the function of scientific theories is to facilitate prediction, the theoretical terms do not refer to any special entities, is more tenable than the realistic theory.

In Maxwell's view, the above ideas are based upon misconception of confirmation-relation, namely, strict confirmationism and strict inductivism. He argues that strict inductivism according to which confirmation is said to be achieved by simple inductive arguments like simple enumeration and Mill's methods, totally inadequate. For every simple inductive argument with true premises and acceptable conclusions, one can construct an indefinitely large number of arguments having the same logical form but leading to incompatible conclusions. That is to say, two sets of true premises may separately lead to acceptable as well as unacceptable results,[1] the logical form of the arguments being same in both the cases. Similarly, Maxwell points out that strict confirmationism finds itself at odds with the fact that "no matter how much evidence you may accumulate... there will always be an indefinitely large number of mutually incompatible hypotheses each of which ... will yield ... propositions expressing all of the evidence."[2]

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1. "Theories, Perception and Structural Realism" op.cit. p.8.
2. Ibid, p.8.

Now, if the aim of any philosophical theory of perception is to furnish an account of perceptual judgement and to tell us what they mean and how we are justified in accepting them, then, according to Maxwell, such a theory cannot be given at all. For, to begin with, the ordinary perceptual claims which ascribe such attributes as colour, taste, smell, solidity etc., to the physical objects are, in Maxwell's view, false. In this connection he considers the findings of neuro-physiology and psycho-physics sufficiently convincing to show that direct realism is basically wrong. He says that "if a true and complete explanation and causal account, for example, of our seeing a certain color expanse is given in terms none of which prior to mentioning the conscious experience itself, refers to color (i.e. terms referring to rational stimulation, afferent nerve impulses, neuronal activity patterns in the brain etc.,), then it seems excessively anthropocentric... to postulate the existence of a color expanse <u>external</u> to our seeing of it."[1] Similarly, since we know from physics that material object is a collection of submicroscopic particles and the relations that subsist among them, "there is no plausibly describable manner in which a color (as seen) could inhere in its surface ... the color - in - the - surface would play role in the emission of photons, which are both sufficient and necessary for the retinal stimulation which causes us to see colors."[2] In Maxwell's view,

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1. "Scientific Methodology and Causal Theory of Perception" op. cit. p.151.
2. Ibid, p.151.

not only the secondary qualities but also the primary ones (following Berkeley) exist only in mind,[1] in the sense in which dreams and halucinations do exist. This, however, does not mean that one cannot know the nature or even existence of the external world. Knowledge, including common-sensical knowledge is, according to him, hypothetico-deductive, i.e. belief regarding the existence of external world is only theoretical in nature. If one questions how we can conceive of or meaningfully ascribe any properties to the entities of external world where the only links with our perceptions are merely causal ones, his answer is that "... the only aspects of the non-mental of which we can have any knowledge or any conception are purely structural (or, in other words, purely formal)".[2] Here, "structural" should not be confused with primary qualities like length and breadth. For, according to Maxwell, neither primary nor secondary qualities can be legitimately maintained to be external to the perceiver. "Structure" is to be understood vis-a-vis "content" which is constituted of both primary and secondary qualities. Structural properties are supposed to refer to "abstract" relations characterising a given system.

1. Ibid, p.151.
2. Ibid, p.153.

Maxwell does not accept the necessity to postulate publicly observable constant and enduring physical objects in working out a theory of language-acquisition. But, he concedes the necessity of something other than sensory effects on us in accepting how various terms get their meaning. Maxwell characterises this 'something other' in terms of what Russell calls 'quasi-publicity' which under appropriate circumstances produces similar perceptual effects. The words are learnt in association with various sensations.[1]

Thus, according to Maxwell the function of a philosophical theory of perception has been hitherto misconceived. For, we cannot, in his view, justify our ordinary perceptual claims since they can never be true.

Maxwell thinks that the basic objection to causal theory of perception comes from empiricism of the instrumentalist variety. But he finds instrumentalism untenable because it reverses the relation between theory and observation. In his view, theory is not an instrument of prediction. In fact, it is 'evidence' which works as instrument for testing a theory. The evidential basis for scientific theory given by publicly observable is only evidential basis and not the subject matter.[2]

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1. "Theories, Perception and Structural Realism", op. cit. p.29.

2. "Scientific Methodology and Causal Theory of Perception" op. cit. p.160.

Maxwell's view seems to rest on the following ideas: (1) Mediation Theory in Psychology according to which perception of physical objects is mediated by retinal images transmitted to the brain, and those retinal images are all we ever perceive. (2) Concept-empiricism as a theory of language-acquisition. (3) Essentialist view of science, and (4) 'Scientism' as a solution to solve the dichotomy between commonsensical and scientific knowledge. The tenability of Maxwell's version of CTP depends greatly on the tenability of the above ideas.

Before we undertake an examination of these underlying ideas, we may point out certain obvious difficulties that the theory lands itself into. If the whole of commonsense is false, that is, if all perceptual statements about physical objects are false, does it not lead to the absurdity of saying that both a given commonsense proposition and its contrary are false together? Equally absurd seems to be the stand that although commonsense propositions are all false yet a scientific theory is meant to explain that which is claimed by commonsense proposition. If commonsense propositions are false in principle then what is left for a scientific theory to explain? It would be difficult to explain as to why science borrows its material in the form of models and analogies from commonsense world and not from the world of fantasy if indeed there actually is no difference between commonsense world and the world of fantasy.

Similarly, as Grice points out, the assimilation of material objects to such entities as electron is "repugnant for the reason that material objects, after having been first contrasted, as a paradigm case of uninvested entities, with the theoretical constructs or _entia rationis_ of the scientist, are then treated as being themselves _entia rationis_."[1]

Now, Maxwell's claim that neuro-physiological research in the field of visual perception points to the mediational character of perception is based on the supposition that a neuro-physiological and psycho-physiological thory must be sensation-based. But a theory of vision need not be sensation-based. If one constructs a theory which is information-based as J.J. Gibson does, then perception ceases to have the supposed mediational character. It is only when we ignore that "to assume that visual information comes through the visual sense is not to assume that it comes over the optic nerve, for a sense may be considered as an active system with a capacity to extract information from obtained stimulation"[2], that we are tempted to interpret the neuro-physiological and psycho-physical findings as pointing to the mediational character of perceptions. Maxwell's whole approach is fallacious inasmuch as it takes, as Gibson points out, as a model for vision the kind of indirect visual perception that uses pictures as substitute for things."[3] Explaining the falsity of the

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1. Grice, H.P. op. cit. p.110.
2. Gibson, J.J. "A Theory of Direct Verbal Perception" _The Psychology of Knowing_, ed: Royce J.R. and Rozeboom, W.Gordon and Breach. 1972, p.218.
3. Ibid, p.227.

analogy Gibson rightly concludes:

> Direct perception of a retinal images implies an eye inside the head, in the brain, with which to look at the image. But there is no little man anywhere in the brain who can do this. We do not look at our retinal images and perceive the world in the way that we look at a portrait and perceive the sitter. Putting the objection, another way, the so-called image on the retina is not an image at all, properly speaking, since it cannot be looked at,... and cannot therefore mediate perception. 1

Maxwell's acceptance of concept-empiricism as an adequate theory of language-acquisition appears to be motivated by his desire to avoid the idea of enduring and constant physical objects as basic to language acquisition; and to establish that it is acquired in the course of language-learning. Since a pure stimulus-response oriented theory leads to undesirable consequences, recourse is taken to Russell's "quasi-publicity". It is supposed that language-learning can be explained without having "publicity of physical objects" as a primitive and without falling into the difficulties of a behaviourist theory of language-acquisition. That in spite of the introduction of 'quasi-publicity' a theory like that of Russell, on the basis of which Maxwell admittedly develops his view, is basically empiricist is clear from the fact Russell takes extensive definition as basic to acquisition of knowledge.

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1. Ibid, p.227

According to Russell we come to believe in more or less permanent things through a process of association of vocal noise with some notable features **of** environment and **their** subsequent identification on the basis of induction.[1] But none of these speculations has any empirical basis. In fact whatever experimental evidence is availble suggests that, as Chomsky points out, "the concept of permanent and enduring objects is operative long before the use of language."[2] Even Maxwell accepts that the belief in enduring physical objects is inborn and "programmed into us". But surprisingly, he does not consider it to have any significant role in the acquisition of language. For him "quasi-publicity" entities and sensations are enough for the purpose of learning language. Apart from the objection that we cannot imagine the sort of sensations associated with many words in our language, there is a further objection against the view that sensations are essential constituent aspects of the process of language learning. The criterion of whether one has learned a word is whether one properly applies it in appropriate circumstances and not what sensations he gets when one learns or when one applies a word. Maxwell misrepresents the argument against private language in favour of "public observability" when he says that according to it

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1. Human Knowledge: Its Scope and Limits, Allen & Unwin, 1948, p.75-76.
2. Problems of Knowledge and Freedom, Fontana, 1972, p.19.

"we learn the meaning or use of terms by hearing them used by others in the presence of appropriate publicly observable entities."[1] The argument for public observability is that it is necessary to check whether one has succeeded in teaching/learning a word. The criterion of success is the ability to apply the word properly. This presupposes public checkability which in turn presupposes the possibility of public agreement about the correct application of a word. It is inter-subjective agreement within whose framework we speak of public observability that is basic to language-learning and not private sensations.

We now come to the essentialist view of science underlying Maxwell's thesis. According to Maxwell, science gives the knowledge of essences underlying appearances and scientific theories are their ultimate explanations. Just as the essentialist conception of science prevents fruitful questions from being raised, Maxwell's view also prevents from being raised fruitful and significant philosophical questions. An adequate answer to the cosmological problem must give an explanation of the conceptual relations between science and commonsensical knowledge. It is only when we begin to deal with this issue that the falsity of the dichotomy between

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1. "Theories, Perception and Structural Realism " op. cit. p.28.

commonsense knowledge and scientific knowledge, which is implied in both Maxwell's position as well as instrumentalism, becomes evident. But if commonsense knowledge is considered false in principle than on the one hand a dichotomy is misinvented and on the other the question of conceptual relations between science and common sense is not only lost sight of but made totally irrelevant.

Finally, Maxwell's theory too fails to resist sceptic's attack. What is significant in the case of this theory is that it succombs to sceptic's attack even before the attack begins. Since it anyway denies that commonsensical propositions are true, the question of defending commonsensical knowledge from the sceptic's attack simply does not arise. For Maxwell, as it is for Eddington and Fred Hoyle, scientific knowledge cannot penetrate the "content" or "substance" of reality but has to satisfy itself with its "formal" or "structure". Once our initial position confines direct knowledge to the retinal images this agnosticism however watered-down is a natural consequence.

3.4 Pragmatic Anslysis or Rational Reconstructionism

It is in the approach of Pragmatic Analysts such as Quine, and Morton White that we find the beginning of a conscious effort to liberate philosophical theorising from age old empiricist shackles. It manifests itself with telling effect in their rejection of the familiar dichotomies with which empiricism is infested. Pragmatic analysts reject the sharp distinction between analytic and synthetic statements, the raison de'tre of empiricism, and maintain a pragmatic continuity ranging between pure analytic and pure synthetic.[1] Similarly they reject the dichotomies between the most general principles i.e. category or framework principles and ordinary laws of nature, mathematical propositions and propositions of science. Unlike Carnap for whom philosophy is only a meta-theoretical activity, the pragmatic analysts maintain a continuity between science and philosophy.

Another feature which differentiates pragmatic analysis from empiricism is its wide epistemological framework within which the problem of perception is treated and a broad conception of confirmation. According to pragmatic analysts the test of logical or empirical statements cannot be obtained from fixed theoretical considerations. Instead, such a test, in their view has to take into account the whole system including its relative purpose. Like their predecessors Dewey,

Schiller and James, the recent pragmatists, recognise cognition as a pragmatically oriented phenomenon.

However, it has taken considerable time for the pragmatic analysts to realize fully the radical implications of their own position. Thanks to empiricist character of the philosophical climate until recent time and the lingering empiricist sympathies of its predecessors, the early stage of pragmatic analysis was dominated by empiricism, especially by its instrumentalist variety. In this section we will consider this stance of pragmatic analysis.

Before the publication of his Word and Object, Quine, the leading spokesman of pragmatic analysis, openly takes instrumentalist view of physical objects and entities of science. Consistent with the rejection of all strict dichotomies, Quine rejects the sharp distinction between questions which can be asked within a conceptual system - internal questions and the questions which can be asked about the conceptual system - external questions. Both sorts of questions, for Quine, belong to the same continuum in the sense that both of them are answered in "basically the same way". The mode of answering the two sorts of questions is, accordingto Quine, pragmatic. For Quine, all our concepts have only pragmatic considerations as their grounds. Physical objects are conceptually imported into the situation as

convenient intermediaries...comparable, epistemologically to the gods of Homer."[1] And, further that "in point of epistemological footing the physical objects and the gods differ only in degree and not in kind."[2] Here, Quine accepts phenomenalism according to which "the conceptual scheme of physical objects is a convenient myth."[3] Thus, in spite of his differences with empiricists like Carnap who confines pragmatic tests to external statements (i.e., statements about the conceptual scheme), Quine at this stage is not free from the glamour of empiricist tradition. He says in the empiricist vein "As an empiricist I continue to think of the conceptual scheme of science as a tool, ultimately, for predicting future experience in the light of past experience."[4]

However in his <u>Word and Object</u>, Quine relinquishes the instrumentalist view of physical objects and theoretical entities. Here he offers, as J.J.C. Smart points out, "a full blown realist philosophy of the theoretical entities of physics. This goes along with a realist philosophy of the medium-sized objects, such as tables and trees, which are

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1. <u>From A Logical Point of View</u>, Harvard Univ. Press, 1964, p.44.
2. Ibid, p.44.
3. Ibid, p.18.
4. Ibid, p.44.

discussed in ordinary commonsense language."[1] It is, therefore, not necessary to review the Quinian instrumentalism.

Instead we will focus our attention here on the views of Nelson Goodman whose 'Rational Reconstructionism' is fairly close to empiricism, despite his rejection of crucial dichotomies that characterise empiricist epistemology. Goodman's 'Ideal language' methodology presents phenomenalist empiricism in a novel way. Like Bergmann and Carnap, Goodman attempts at solving (or dissolving) philosophical problems by constructing an artificial language-system. In his The Structure of Appearance, Goodman aims at a rational reconstruction of knowledge. His interest is not in portraying either 'the process of acquiring knowledge' or 'the genesis of ideas'. He is concerned with not 'primacy' in the cognitive process, but 'serviceability' as a basis for an economical, perspicuous, and integrated system"[2] of knowledge, in which "the definiens is a complex of interpreted terms and difiniendum a familiar meaningful term, and the accuracy of

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1. "Quine's Philosophy of Science" Words and Objections, J. Hintikka and D. Davidson, p.6. D. Reidel, 1969, p.6.

2. "The Revision of Philosophy" American Philosophers At Work ed: Hook, Sidney, Greenwood Press, New York, 1969, p.80.

the definition depends upon the relation between the two."[1] Goodman distinguishes systems of logical philosophy which he characterises as 'constructional' from "uninterpreted formal systems and amorphous philosophical discourses."[2] Systems of logical philosophy or constructional philosophy, according to him, "may be founded on different bases."[3] He combines in his constructional system the content of ordinary philosophical discourse with the rigour of a purely formal system. The system of his rational reconstruction contains only one type of variables covering simple individuals and their 'sums', the latter structurally substituting 'classes' which are indispensible to any ontologist. His system, an isomorph of class calculus, is the calculus of individuals. It is nominalistic in the sense that its language contains no names or variables for classes. In other words, classes and predicates do not have any existence independent of objects or extentions. Similarly the system is non-particularistic in the sense that the individuals are not concrete entities but abstract characters. That is to say, individuals are nothing but constructs of qualities.

The most conspicuous feature of Goodman's system is its thorough-going nominalism which results from a deep-rooted desire for strict economy in what is to be counted as an

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1. The Structure of Appearance, Bobbs-Merrill Co., 1966, p.3.
2. Ibid, p. xviii.
3. Ibid, p. xviii.

explanation. He does not want to have any truck with vexing concepts like meanings, attributes, classes, dispositions, counter-factuals etc., since such abstractions, according to him generate paradoxes[1] and since their use only brings philosophical problems from backdoor.

What decides the primitivehood of atoms of a logistic system for epistemological purposes is their capacity to make experience intelligible and not their indefinability. For indefinability is relative to a given system. In this connection Goodman works out an elaborate technique to enable us to choose simplest primitives. The primitives in his system are got by dividing "the stream of experience into its smallest concrete parts and then go on to divide these concrete into sense-qualia."[2] The qualia are not properties for they are constant. Also they are not subject to errors because of their immediacy.

Goodman, then, explicates with the help of a new primitive, W, the relations among associated terms like complex, concreta and qualities. The primitive W is defined as 'symmetrical, irreflexive and non-transitive.'[3] Thus, a concretum is explained as "a <u>fully</u> concrete entity in that it has among its qualities at least one member of every category within some sense realm."[4] Its two discrete parts are connected

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1. Steps towards a Constructive Nominalism" <u>Journal of Symblic Logic</u>, Vol.XII (1947), p.105.
2. <u>The Structure of Appearance</u>, p.189.
3. Ibid, p.204.
4. Ibid, p.204.

by the relation 'W'. Similarly a complex is defined as an individual of two discrete parts bearing the relation W to each other. And, qualities are just those complexes which are not qualia, Based on these, Goodman further defines concepts like 'particularity", 'universality", "abstraction" and "concretion" etc.

A physical object, for Goodman, schematically consists of a colour, a place, and a time tied together by a primitive relation of togetherness. Thus, according to Goodman the physical objects are constructs. The problem of relations, that is, of ordering qualia is settled by deriving the descriptive relations from a single binary connection which he calls matching. Such relational predicates being defined in the ideal language, with whatever incomplete plausibility, remain for Goodman ontologically neutral.

One conspicuous feature of Goodman's theory is its sole emphasis on the visual senses to the total neglect of other senses. Ayer rightly points out:

> To what extent, if any, a description of the physical world could be fitted into this framework, or into an extension of it which admitted the data of other senses, is left an open question. 1

It is an interesting fact that in the phenomenalistic theories vision always gets an exclusive importance even though it is

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1. <u>The Central Questions of Philosophy</u>, Pelican, 1976, p.91.

admitted that visual sense is only one of several other senses. In this respect Goodman's theory suffers from the same weaknesses as sense-datum theory. For sense-datum theory starts with arguments from illusion and relativity of perception wherein we find examples mostly from visual perception. This apart, there is a basic ambiguity as regards the atoms of Goodman's system. Sometimes they are spoken of as sensations (as opposed to properties). In this respect the way they are spoken of is, as Ayer points out, "reminiscent of Berkeley's reference to sensible qualities."[1] But they are regarded as universals. Whether atoms are to be considered as particulars or universals, is therefore, unclear. Thirdly, as Hausman points out, the fundamental ties which provide grounds for distinguishing an ordinary thing, say, a chair from a mere collection of its constituents such as its colour, hardness etc., are precluded from Goodman's nominalism.[2] Non-recognition of this distinction is not justified by Goodman anywhere. What is more important to note is that such distinctions cannot be even accommodated without relinquishing nominalism which is central to his thesis.

Apart from usual empiricist ideas like 'incorrigibility', concept-empiricism readily comes to the surface in Goodman's scheme, when the 'constancy' of the physical objects is made dependent on qualia. This dependence is central to

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1. Ibid, p.71.
2. See Hausman A., Wilson F. Carnap and Goodman, Two Formalists Martinus Nijhoff. The Hague, 1967, especially p.84.

Goodman's thesis. Earlier in this Chapter we have already examined the viability of concept-empiricism.

Since Goodman's system is supposed to be a rational reconstruction of knowledge one must be able to construct in it the intersubjective concepts of science. But since Goodman is committed to a nominalistic logic and to a finite set of individuals it is hard to imagine, as Hempel points out "how, on this basis, it would be possible to construct the quantitative concepts of science with their infinite sets of numerical values."[1]

Of course, Goodman makes it explicit that the formal language of logical philosophy can be built on different bases. For clearing some philosophical perplexities, phenomanalist language system will do well and for others some other type of system might prove more adequate. However, if one wants to show through a construction of ideal language that metaphysical problems are not genuine then one has to show that all philosophical problems can be solved by the

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2. Reflections on Nelson Goodman's "The Structure of Appearance". Philosophical Review, Vol.62 (1953), p.115
Hempel suggests that a physicalistic system of the particularistic variety can be preferred to Goodman's system. According to Hempel, Karl Popper in his "Logik der Forchung" recommends such a system. But a language which an ideal language philosopher constructs, be it Carnapian, Goodmannian or the one recommended by Hempel has as its motive force in the elimination of metaphysical questions. It should be a language such that everything that can be said in science and commonsense can be said in it but metaphysical questions and problems of scepticism cannot be raised. But for Popper metaphysical questions are not due to linguistic confusions. They are, in fact, necessary for scientific progress. Hence they form a legitimate part of human knowledge. One wonders, therefore, how a physicalist-particularist formal system can square with Popperian ideas

same formalism. Otherwise as Bergman points out we do not know whether we have solved any.[1]

The most important gap in Goodman's scheme is about the purpose of the theory itself. Is it for constructing an ontology? Does Goodman want to be a phenomenalstic Spinoza? Or is it merely to work out a relation between sense-data statements and other statements? In other words is it to provide a logical form to sense-datum theorists' programme? Or does Goodman intend to be a phenomenalistic Carnap. It seems that Goodman wants to do none of these. Then, is it to dissolve the problems of philosophy by constructing an ideal language system in which we cannot ask philosophical questions? Perhaps, yes. He says, "I look upon philosophy as having the function of clearing away perplexity and confusion on the most humble as well as on the most exalted levels of thought."[2] But, then, how can one decide whether the terms of ordinary language are properly translated in this new system? How without getting the concepts in ordinary language clearer can one work out their translations? In other words, ideal language philosophy in order to make a start must answer the methodological challenge that ordinary language philosophy poses.

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1. The Metaphysics of Logical Positivism, Macmillan N.Y. 1946, p.116.
2. The Structure of Appearance, p.xvii.

In concluding it may be said that the dubious victory that Goodman seems to have scored over the sceptic is made possible only by positing to knowledge of a certain unchangeable, fixed core in terms of the arbitrary definitions which constitute the basic elements in Goodman's system. However the sceptic is in no way forced to accept these definitions. As a matter of fact Goodman's theory is yet another illustration of a certain philosophical type dominating the past epistemology which considers the growth of knowledge and development of concepts as irrelevant to the philosophical treatment of knowledge. What is surprising here is that this is done in the name of pragmatic philosophy.

CHAPTER 4

TOWARDS A THEORY OF PERCEPTION

In this chapter we attempt to develop a theory of ordinary, commonsensical perception. The formalist school as we have seen in the preceding chapters holds that ordinary perceptual claims involve a jump from sense-data to the objects about which the claims are made. The natural consequence of this interpretation of perceptual statements is the problem regarding the justification of this jump. In their justificationary scheme the formalist theories try to work out a relation between the 'given' or 'sense-data' and the objects of perception. It is here that they fail, as we have seen in our consideration of the views of Ayer, Chisholm, Grice and Goodman.

A few words towards the diagnosis of the malady viz. 'the crisis of integrity' faced by recent epistemologies are in order. When perceptual claims are looked upon as involving a jump from the 'given' to the 'claimed', perceptual knowledge comes to be endowed with a dual structure, viz., a sub-structure which is theory-independent or concept-free and a super-structure which is theory-dependent or concept-ridden. Since theoretical or conceptual elements are human innovations the Super-structure, in their view, needs to be shown as being grounded in the sub-structure. The failure in working out a justificationary

relation between the two structures is a known story. The failure of the formalist school is but a continuation of the failure of the grand theories on this count. Thus, Descartes' failure in showing the self-evident character of the correspondence between 'self-evident', clear, indubitable and a priori ideas on the one hand, and the objective reality on the other, the sceptical predicament of Hume, and agnosticism of Kant are all antecedents to the 'crisis of integrity' which the formalist progeny of the grand theory of empiricism exhibits. It is an irony in the history of epistemology that what Popper calls 'the subjectivist blunder' is committed in the attempt to give objective credence to our perceptual as well as scientific knowledge. Thus, for instance, the sub-structure which provides the terms for philosophical justification of ordinary perceptual claims in particular is constituted by the alleged subjective elements like 'sensations' or 'sense-data' in the terminology of those who were inspired by the 'new way of ideas', and statements concerning sensations, sense-data or appearances in the idiom of those inspired by the 'new way of words'. In order not to fall prey to the traditional failure, the subjectivist blunder has to be a point of departure for any adequate theory of perception. In other words, it has to reject

the dual structured conception of knowledge along with its paraphernilia of 'theory-freedom', 'purity' and 'a-theoretical basics' etc. Hence, to take the first step towards an adequate philosophical account of perception is to claim that at no stage perceptual knowledge is theory-free or concept-independent or pure. In our view, perceptual knowledge is theory-dependent or concept dependent through and through.

4.1 Theory-dependent Character of Perception

But what grounds are there for regarding that what is prior to perception is a theoretical frame and not the a-theoretical sensory experience? Three main considerations can be given in support;

(a) Argument from illusion

(b) Argument from the context dependence of perceptual claims

(c) Argument from consideration of perceptual knowledge in its dynamic mould.

(a) We have already seen how the argument from illusion has been used to support the contention of the sense-datum theory that perception involves pure sensory given. But in fact this argument can be employed in support of the diametrically opposite contention. According to the sense-datum theorist the possibility of illusion is to be

four kinds: (1) Existential belief failure (2) category belief failure (3) characteristic belief failure (4) 'knowledge about' belief failure.[1] Existential belief is that whatever objects we take to be seen has external existence. When this belief fails, we have such seeing mistakes as hallucinations and after-images. Category belief is about the proper category of a perceived object. Obviously failure of this belief means illusion such as "seeing a snake for a rope". Characteristic belief is about a physical 'characteristic' of what one sees. When this belief fails, we have such illusions as a straight stick looking bent when half immersed in water. 'Knowledge about' beliefs refer to our knowledge about the object we are seeing. If these beliefs fail, then also, there would be seeing-failure. Suppose I see a thermos flask and also some vapours coming out of it, and, I rush to pour some coffee out of it. But I find no coffee in it. Here I mistakenly thought of or 'saw' a flask containing coffee because of the belief that any flask giving out vapours should be containing coffee (or some hot liquid).

What is meant here is not that failure or success of seeing is due to or caused by the sorts of belief mentioned above. Instead it is that "the belief criterion is a way to <u>distinguish</u> success from failure and should not be taken as the <u>cause</u> of success or failure (For) we cannot even

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1. <u>Seeing, Knowing and Believing</u>, Allen and Unwin, 1966, pp.109-125.

properly talk of our judgements as causes of success or failure...."[1] Such beliefs are not beliefs in the usual sense. Usually if a belief fails, we reject it or discontinue to hold it. But such 'belief' as above we continue to hold even though we come across instances of their failure in a variety of seeing-mistakes. This is because they are necessary to be held in order to cope with our environment - a task which would be impossible and even inconceivable without such beliefs. This fact highlights the basic purposive or teleological nature of all perception. The nature of these beliefs, an implicit awareness of their necessity in the task of coping with our environment, and, the recognition of the task itself - all these are theoretical ideas in the sense of being logically prior to any actual perception.

Furthermore, the view that in illusion we claim more than what is warranted implies or at least strongly suggests that there is a hard-core element of sense-experience which is first misinterpreted but upon the elimination of illusion comes to be properly interpreted. It would mean that it is the same constant that decides what is warranted and what is not. In fact, in no case of illusion, an illusion is eliminated without further observation. When a rope appears to be snake to someone and if he either pelts a stone at it or throws light on it, his illusion gets eliminated.

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1. Soltis, Jonas, F. Seeing, Knowing and Believing, p.114.

The above thus goes to show that the characterisation of the phenomenon of illusion by the subjectivist position like sense-datum theory is at best, highly incomplete and at worst grossly misleading. In fact, reference to illusion is counter-productive in so far as the main contention of sense-datum theory is concerned.

(b) We now come to the second argument, viz, the argument from the context dependence of perceptual claims. Our linguistic habits reveal that there are strong variations in the degree of context dependence of the meanings of linguistic expressions. Of the two statements (1) Ice floats on water and (2) It is raining, the former can be understood by almost any English-knowing person to refer to the same state of affairs. But what the latter is intended to refer to will be fully graped only by those who know the place, and the time of its utterance. Bar-Hillel characterises the second type of sentence as indexical or indexical declarative.[1] He points out that "more than ninety per cent of the declarative sentence-tokens we produce during our life time are indexical sentences...it is plain that most sentences with lensed verbs are indexical not to mention all these sentences which contain expressions like 'I', 'You', 'here', 'there', 'how', 'yesterday' and 'this'."[2] Evidently, most perceptual claims are indexical.

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1. "Indexical Expressions" Mind (63), 1954, pp. 359-379.
2. Ibid, p.366.

Now, in order to grasp the propositions expressed by the indexical sentences one should know the pragmatic context of the production of indexical sentence tokens. "To communicate the same amount of information by using non-indexical sentences only, knowledge of the context by the recipient is not required, but in its stead additional knowledge of some other kind may be necessary."[1] Two significant points follow with regard to the fact that most of perceptual statements are indexical expressions.

(a) They should be treated with an eye on their pragmatic context. That is, one should take into consideration the purpose of the utterer. In other words, perceptual claims cannot be obstracted from the purpose with which they are made by their maker. "In the real life ... my consciousness is dominated by the pragmatic motive, that is, my attention to this world is mainly determined by what I am doing, have done or plan to do in it....I know, of course, that the reality of everyday life contains zones that are not accessible to me in the manner. But either I have no pragmatic interest in these zones or my interest in them is indirect in so far as they may be potentially manipulative zones for me."[2] The purposive character of the perceptual knowledge is also implicit in the ordinary usage which makes a clear distinction between "see" and "happened to see" or "just happened to see".

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1. Ibid, p.368.
2. Berger, Peter L. and Luckmann, Thomas, The Social Construction of Reality, Doubleday and Co. 1966, p.22.

Once it is recognized that the purposive character is an integral part of a perceptual claim and that the purposive character cannot be treated as posterior to the sense-experiance, the logical priority of pure sense-experience, ~~the logical priority of pure sense-experience~~ (or statements concerning it) cannot be maintained. More than this, the priority of the theoretical framework borne out by the character of the indexical expressions comes to the surface once it is realised that their understanding "requires some reference to the role of "what everyone knows" in deciding the indexicality of the utterance or some part of the utterance".[1]

(c) The theory-ridden character of perceptual knowledge is made further evident, if one considers perceptual claims in the contexts of the relevant rival scientific theories. Consider, for example, Tycho Brahe who believes in the geocentric theory and Kepler who believes in the heliocentric theory witnessing sun-rise standing on a hill-top see. Here, it cannot be objected that we have chosen an example with a strong scientific flavour to establish a point with regard to the ordinary, commonsensical perception. For, commonsense is not static. The autonomy of commonsense does not mean its total immunity from scientific knowledge. After all, the commonsense of

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1. Cicourel, Aaron V, "The Acquisition of Social Structure: Towards a Developmental Sociology of Language and meaning" Understanding Everyday Life, ed. Douglas, J.D. Routledge Kegan Paul, 1971, p.

4th century is not the same as that of 16th century. The question is, "Do they see the same thing or not?" Of course in a sense they see the same thing. For, as Hanson points out, "Unless both are visually aware of the same object there can be nothing of philosophical interest in the question whether or not they see the same thing."[1] But the sense in which they see the same thing is unilluminating in understanding the controversies in the physical theory. Scientifically relevant 'seeing' has to be "more than simply gesturing at observable objects." It requires a conceptual organization to see things in a way that is relevant to scientific understanding. In fact, 'seeing' in the sense of seeing the same thing means not just that "they have same visual experience" as the subjectivist likes to think but that they agree on more than in mere having same sense-experience. They see the same thing to the extent that they share same knowledge about what they see, and they see different things to the extent that their conceptual organisations differ. What is important in perception is not 'pure sense-experience' but conceptual organisation or theoretical framework. This is brought out even more tellingly in the context of perceptual claims about coloured objects in different languages where some languages have more descriptive terms and thus are capable of finer distinctions. Language is, as Berger and

1. Patterns of Discovery, p.7

Luckman point out "coercive in its effect.....(It) forces.... (us) into its patterns".[1] The totality of these patterns constitute the world-view of the user of a particular language. Brown brings this out very wel in his formulation of the whorfian hypothesis. He says, "Each language embodies and perpetuates a particular world view. The speakers of a language are partners to an agreement to perceive and think of the word in a certain way not the only way."[2]

Similarly a look into the history of art also reveals how the search for 'given' or 'pure appearance' is futile and even dangerous. Visual arts can be taken to be an evolved form of ordinary perception in the sense that vividness of ordinary perception acquires a special emphasis in visual art, and also in the sense that visual art is characterised by the "the mysterious way in which shapes and marks can be made to signify other things beyond themselves."[3] It is significant that both in philosophy and visual art the search for what we 'see' as distinct from what we 'know' started vigorously at the same time, namely, the beginnings of the post-Renaissance period.

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1. Op. Cit. p.37.
2. Words and Things, The Free Press, 1958, p.230.
3. Gombrich, E.H. Art and Illusion, Pantheon, 1961, p.vii.

The attempt to get rid of the 'Egyptian' who could point only what he 'knows' and not what he 'sees' started along with the attempt to get rid of all a priori ideas so as to make the mind a "Tabula Rasa'. In visual art the attempt to achieve 'pure' representation culminated in the work of impressionists. In this process the seekers of pure-representation relegated "everything,...which we bundle together into the word 'style!'[1] As Gombrich says, "style rules even where the artist wishes to reproduce nature faithfully."[2] In fact, as soon as we start to take pencil and draw, the whole idea of surrendering passively to what is called our sense impressions becomes really an absurdity. The technique restricts the artist's freedom of choice and thus his perception itself. Gombrich says "sitting in front of his motif, pencil in hand, the artist will.....look for those aspects which can be rendered in lines....he will tend to see his motif in terms of lines, while brush in hand, he sees it in terms of masses."[3] Therefore, "The Egyptian in us can be suppressed, but he can never be quite defeated."[4] It may be noted that in all these attempts

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1. Ibid, p.64.
2. Ibid, p.65.
3. Ibid, p.65.
4. The Story of Art, Phaidon, 1957, p.422.

to portray reality as one 'sees', "style" (and hence artist's prior knowledge) is taken to be only contingently related to his perception or production, just as the subjectivist took language and experience or to be more precise "language" and "publicity" to be only contingently related. It may also be noted that just as the "self-contradictory programme of the impressionists contributed to the collapse of representation in the twentieth century art,"[1] the search for pure appearances pushed the whole problem of philosophy of perception into such a jungle of confusions that Ryle seems to have rightly remarked that "the philosophy of perception is not only in the melting pot, it is in it upside down."[2]

The theory-dependent character of perceptual knowledge is manifested in the fact that the perceptual claims involve prior knowledge without which they do not make sense. The prior knowledge constitutes the theoretical framework on which depend the life of all possible predicates, the higher order ones like those which occur in perceptual statements as well as those that "directly" refer to the sense experience. Therefore, what constitutes "given" is not "the theoretical basics" but this theoretical framework.

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1. cf. The last chapter of The Story of Art.
2. Quoted by Warnock G.J. in his "Introduction" to The Philosophy of Perception, ed. G.J. Warnock, Oxford, Univ. Press, 1967, p.2.

To speak of somebody having knowledge perceptual or otherwise, is to presuppose that the person who is said to know has certain ideas or concepts in terms of which such knowledge is formulated or expressed. To say that X knows that a is b is to presuppose that X has the relevant concepts a and b; i.e., he knows what it is for something to be a or b. Knowledge of facts, in other words, involves knowledge of concepts. Thus, as Hamlyn points out, "whether or not a person has ...prior...(i.e. of concepts) knowledge may itself emerge in what things of factual kind he may be said to know."[1] That is to say, the limits of perceptual knowledge, are drawn in an essential sense by the totality of concepts which the perceiver has. The totality of concepts a person has determines what propositions he assents to.[2] Further, to have any concept, one needs to know not only its formal defining conditions but also the conditions of its application. In other words, one must be able to apply it in appropriate circumstances. Since the latter cannot be expressed formally, it is necessary that there should be generally agreed upon instances of its application.

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1. Theory of Knowledge, p.54.
2. Geach. P.T. Mental Acts, Routlege and Kegan Paul, 1957, p.11.

Wittgenstein candidly brings out this point in his observation: "If language is to be means of communication there must be agreement not only in definitions but also (queer as this may sound) in judgements...It is one thing to describe methods of measurements, but another to obtain and state results of measurement. But what we call "measuring" is partly determined by a certain constancy in results of measurement."[1] The conditions of application, which Wittgenstein cals 'criteria' are concerned with the normal circumstances in which a concept gets application. Knowledge of normal circumstances of a concept's application is presupposed by our perceptual claims.

Even the concepts which supposedly refer to sense-experience directly cannot be learnt in isolation. For example, the colour concepts themselves involve reference to other concepts which do not refer to any particular sense-experience. The belief that concepts like red are basic concepts or that they are descriptive terms directly referring to elements of sense-experience is based on the questionable inference that from the fact that we would have no understanding of "red" independent of some perceptual content, it follows that 'red' is the name of experience. 'Red' cannot be learnt or used outside the general framework of the notion of colour which itself presupposes further concepts like those of

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1. Philosophical Investigations, p.88.

extended objects, surfaces and transparent substances. None of these concepts can be exhausted in terms of any or all possible sense-experiences. Hence 'pure sense-datum statement' is a contradiction in terms and 'pure sense-experience' or 'pure observation' is a myth.

The theoretical framework provides the interpretative procedures for making sense of or assigning meaning to our experience. It is wrong to characterise these procedures as mere "rules"[1] as Hayek thinks. They "are not rules in the sense of such general policies or practices as operational definition or legal or extra-legal norms, where a sense of a "right" or "wrong" pre- or proscriptive norm or practice is at issue. Instead they...exhibit empiricaly defensible properties."[2] In other words, the interpretational procedures of the theoretical framework provide descriptive vocabularies which, as Garfinkel points out, become constitutive features of the very experience that is being described.[3] This fact is singularly overlooked by those who insist on the purity of sense-experience.

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1. Hayek, Von, "Rules, Perception and Intelligibility" Studies in Philosophy, Politics and Economics, Oxford Univ. Press, 1967, p.48.
2. Cicourel, A.V. op. cit. p.146.
3. "Studies of the Routine Grounds of Everyday Activities" Social Problems, 11 (1964) pp.225-250.

4.2 Nature of the Theoretical Framework

A few words regarding the nature of the conceptual framework are in order. To say that the criteria for the concept X are Y and Z is to invoke a relation between X, Y and Z. It may be noted here that we can speak of normal circumstances in which X gets applied if and only if we have the concepts Y and Z. Thus, to acquire a new concept is also to understand its relation with the concepts which we already have acquired. It is because our perception is concept-laden or theory-dependent and because the concepts are inter-related, "seeing" is always "seeing as" and "seeing that", a point which we have already made and which will be taken up later in some detail. Suffice it to say that the inter-relation of concepts is reflected in our seeing things only in relations. This interrelation between the concepts lends the whole ofthe theoretical network a web-like nature. We have seen how the concept of colour presupposes other concepts like those of extended objects, surfaces etc.. Thus, under-standing of even one particular colour concept presupposes a web of concepts. The totality of the concepts viz, language constitutes and also is an expression of a world-view. Of couse, not every concept is related to every other concept in an equally intimate way, just as in a network every bit is not related every other bit in the same intimate way.

But every concept has some concepts which are related to it in a law-like manner. These concepts which form its neighbourhood constitute its "normal background". It is by sloughing off the conceptual connections which form the web of conceptual network, that is, by giving application to a concept without reference to the other concepts that form its normal background that the use of a concept becomes empty and we have what Wittgenstein calls "machine idling". Semantic anamolies, category mistakes and sometimes, even metaphysical unintelligibility results precisely because a concept is isolated from its normal background and thus from the whole web of the theoretical framework which is its 'natural home'.

Contrary to the empiricist way of thinking the theoretical network does notfloat on the so called experience. As Quine points out, it "impinges on experience...along the edges."[1] Since no part of the conceptual network is immune to change, and since the predicates referring to the sense-experience are also parts of this network, even they are not immune to the conceptual revision. As Quine observes that when discrepancies occur "we retain a wide latitude of choice as to what statements of the system to preserve and what ones to revise."[2] Naturally we revise those which upset the system least by their being revised and retain the statements which are closest to experience as well as those

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1. From a Logical Point of View, p.42.
2. Methods of Logic, p.xii, Holt, Rinehart and Winston, 1959, p.xii.

which are too general and thus too fundamental to the system.[1] The relative stability of our concepts concerning experience are to be accounted for by this fact, In no way it follows that their stability points to their lying outside the conceptual network itself. Therefore, no aspect of perception is stable in an absolute sense.

We shall discuss now some important implications which follow from our consideration of perception as they-laden. In our opinion there are four epistemologically consequential implications which deserve elaboration. They are:

(a) that to perceive is to perceive in relations.

(b) that realism is necessarily true.

(c) that perception is socially determined.

(d) that the roots of objectivity are to be sought in the intersubjectively shared theoretical framework.

In what follows we shall consider them separately.

4.3 Perception as relation-oriented

In his Philosophical Investigations Wittgenstein brings out the complexity of the concept of seeing by taking various examples of 'drawings of' or 'noticing an aspect'. It happens at times that while looking at something we suddenly begin seeing something new. For example, looking at a picture we suddenly begin to notice some feature of it of which we were not aware before and at the same time know that the figure

1. From a Logical Point of View, p.44.

has not changed. Or, when, for example, we recognise all of a sudden a face or its likeness to some familiar face we become aware of something we were not aware of before even though the face has not changed in between. In these cases of seeing we see something as something. That is here 'seeing' is 'seeing as'. Such cases as these, for Wittgenstein, are different from those which are more of a routine order as for example, when we see things as light is switched on or a curtain is removed or when we see a conventional picture of a lion. In such contexts, 'seeing' for Wittgenstein is not 'seeing as'. According to him, in the cases of 'seeing as' a logical condition of our seeing something is our ability to make some application of the figure or to react to it in certain definite ways. "It is only if someone can do, has learnt, is master of, such-and-such that it makes sense to say that he has had this experience."[1] In this case - that is that of "seeing as", we have, for Wittgenstein, "a modified concept of seeing."[2] But, as Strawson points out, "it is not very happy to speak of a modification of the concept of seeing in a way which suggests that a certain feature which is common to both seeing and 'seeing as' is peculiar to the latter."[3] Further, the distinction between 'seeing' and 'seeing as' seems to be artificial since both cases of 'seeing'

~~just "seeing" as different from 'seeing as' also needs learning~~

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1. Philosophical Investigations, p.209.
2. cf. Ibid, p.209.
3. "Review of Wittgenstein's Philosophical Investigations" Wittgenstein: The Philosophical Investigations ed: G.Pitcher, Doubleday & Co. 1966, p.61.

involve concepts i.e. ability to use concepts. Therefore it appears that Hanson is right in treating "seeing as" along with "seeing that" as logical component of 'seeing'. Of course, it is true that Hanson's account fails to provide proper guidelines to demarcate ~~for demarcation~~ between the cases of seeing which involve the utilization of appropriate knowledge and the cases seeing which do not.[1] That is to say his account of seeing does not have the finer edges to help us to delineate clearly the instances of seeing-success from those of seeing-failures. However, the important point of Hanson's discussion of "seeing as" and "seeing that" is only to draw out certain logical features of the concepts like 'seeing and observing.[2] In Hanson's account 'seeing as' and 'seeing that' are not totally distinct. He makes it clear that 'seeing as' is just used to point out what and how 'seeing that' is obtained.[3] In other words, it is to expose the logical mechanism of 'seeing that' that Hanson uses 'seeing as'. We perceive physical objects in certain relations, some presented to us when we 'see', whereas some are not. When I say "I see a bird sitting on the top of that tall tree" I see the bird with all its properties. I also see the bird as something

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1. Soltils J.F. Seeing, Knowing and Believing, pp.42-46.
2. Hanson, N.R. Patterns of Discovery, p.21.
3. Ibid, p.21.

different from inanimate things. Thus 'seeing that' "treads knowledge into our seeing."[1]

To say that 'seeing" involves 'see that' is to say that when we see an object we see it in some relations and states and /or as being capable of entering into certain relations and states. The most important relation into which the objects enters is the causal relation. When we see an object we see it as capable of causing and being causally affected by, other things. This is what wisdom means when he says that every perception involves 'aetiology' and 'prognasis.'[2] i.e. knowledge regarding the causal relations concerning the object said to be perceived and a fore-knowledge of the states of the object perceived.

To see an object therefore, is to see it in various relations or connections. These connections pertain to the genus and the object differentiation and the various properties the object possess and the relations it normally enters into. If we mean by a fact a thing or things in certain relations, perception of a thing or an object is always a perception of a fact. This use of the word 'fact' might appear too far-fetched. But it is only to emphasise that a thing is inseparable from those connections referred to by "seeing that". An account of physical objects like that of physicalism which

1. Ibid, p.22.

2. cf. "Gods" Proceedings of the Aristotelian Society, Vol.XLV (1944-45) pp.185-206.

makes physical objects themselves basic is, therefore, questionable.

4.4 Perception and Realism

In the subjectivist tradition the relation between perception and the world of physical objects is thought to be merely contingent one. The problem that it seeks to solve is how to build up a common and objective world from individual sense experiences, or, how to justify such a building of a commonworld on the basis of sense-experiences. In other words, in its view realism or the belief that there are physical objects independent of our sense-experience is only a contingent belief which needs justification. Even Popper who rightly recognises that "Realism is essential to commonsense","[1] that "commonsense is unquestionably on the side of realism,"[2] and that "realism is a part of common sense."[3] seems to concede to the subjectivists that realism has only a contingent basis when he says "I propose to accept realism as the only sensible <u>hypothesis</u>, as a <u>conjuncture</u> to which no sensible alternative has ever been offered."[4]

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1. <u>Objective Knowledge</u>, Oxford Univ. Press, 1972, p.37.
2. Ibid, p.38.
3. Ibid, p.39.
4. Ibid, p.42 (Emphasis added)

In the preceding pages we have argued against the possibility of 'pure seeing' or of 'given'. In our view, seeing at every stage involves use of concepts. To use concepts is to know their criteria which are intersubjectively shared and hence, public. That is to say, the agreement in our perception presupposes a common framework and a common world. The idea of 'building a common world out of private elements' is unintelligible and therefore, as we have seen its justification is theoretically impossible. The existence of a common and independent world is a presupposition of any knowledge, however primitive. The belief in independent world can neither be a hypothesis nor be a conjecture as Popper thinks. Its status is that of a necessary truth in the sense that it cannot be proved because it is the presupposition of all our talk of giving proof or giving reasons or even of falsification. In this sense, our belief in an external world common to all perceivers has the character of Kant's 'synthetic apriori'.

4.5 The Social determinateness of perception

In the context of the preceding discussion one may be tempted to say that the theoretical framework has acquired an aura of occult of apriori characteristic of rationalism.

But we do not stop here. In our view the theoretical framework itself is grounded in something which is anything but occult. This brings us to the third implication, viz, that perception is socialy determined. Idealists like Bradley rightly recognise the seminal role of concepts in perception. But because of its intrinsic inability to go beyond ideas or concepts idealism indeed led to embrace the occult of apriori and to make the fantastic claim that all propositions about world are to some extent false.

It may be recalled that in our characterisation of the theoretical framework we have pointed out that the theoretical framework incorporates not only the concepts in their interrelatedness and their criteria, but also the 'beliefs' which though are fallible and sometimes false too, cannot be dispensed with since without them it is impossible to cope with our environment. It is necessary to understand here what we mean by 'environment'. In the case of animals their environment is fixed, determined and also species-specific. But the environment of human beings is characterised by "world-openness".[1] That is, they apply their "constitutionally given equipment to a very wide and in addition, constantly variable and varying range of activities."[2] The manifestations

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1. Berger, P. and Luckmann op. cit. p.45.
2. Ibid, p.46.

and the variety of this immense plasticity in their response to th environmental forces are to be traced to the socio-cultural life of man. In other words, the 'environment' should not be understood in the closed and fixed sense. The environment is what human beings who cope with it recognize it to be. And they recognize it in accordance with the mode of socio-cultural life. Thus, our "environment is both a natural and a human (and thus a social) one."[1] Therefore, the 'belief' aspect of the theoretical framework has to be viewed in the context of our socially determined attempt to cope with our environment, or our attempt to cope with our environment as socially conceived.

The socially determinate character of concepts in their interrelatedness and their criteria can be easily seen if we appreciate the fact that language - the natural home of all concepts, is itself socialy determined. It is thorough language that the conceptual struoture is transmitted from one generation to the other. Moreover, language is not merely a system of rules as it has been conceived by the empiricist philosophers. For, the idea of meaning in general presupposes the idea that people mean something when they use words though they can mean something only if words have meaning. It is in this context that Wittgenstein's use of "use" and

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1. Ibid, p.46.

"language game" is significant. It highlights the fact that there are different roles that the linguistic expression can play and thus serve a variety of purposes. This point is missed by empiricists for whom language as an activity has no significance. For them words have meaning only so far as they refer to something. Of course, a language will have rules which lend it the necessary stability. But that is not to say that language is nothing but or basically a system of rules. Rules have the status of, as Wieder points out, idealisations "wherein what the activity of using rules amounts is settled by theoretical fiat."[1]

Similarly to consider language as biologically determined is to ignore certain essential features of language. One of the versions of the biological view of language is that certain linguistic universals commonly shared by all grammars are biologically determined. This has a purchase only if we close our eyes on the brute fact that every society has distinctive linguistic configurations and specialised patterns of linguistic conduct. The empirical relativity of these configurations, the immense variety and inventiveness are pointers to the socio-cultural basis of language rather than a biologically fixed human nature.

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1. "On Meaning by "Rule" Understanding Everyday Life ed. Douglas J.D. Routledge and Kegan Paul, 1971, p.109. (emphasis added)

Once the above two mistaken views are recognised to be so, it is not difficult to look at language as a socially determined phenomenon. The different patterns which constitute the world-view that language embodies are directly related to our practical or social life. That is, the nature and the amount of patterns depend upon their adequacy for the purpose of our social - practical life. Moreover, introduction into a particular mode of using language is an initiation into a set of social practices. One must know in order to use or understand a language the totality of social practices involved. One cannot understand a welcome speech or an abuse or request unless one knows what the relevant social practices are. "A child" as Cicourel points out, "cannot be taught to understand and use ....rules (of language) unless he acquires a sense of social structure, a basis for the assigning meaning to his environment. The acquisition of language rules is like the acquisition of norms...The child must learn to articulate a general rule or policy (a norm) with a particular event or case said to fall under a general rule... There are no...rules for instructing the child on how the articulation is made."[1] It is only by understanding "forms of life" that we get the ability for this sort of articulation. The knowledge of the forms of life or social practices gives

1. op. cit. p.146.

language what "paradigms" give to normal science in Kuhn's scheme. Suffice it may here to say Language, thus, does not give just rules for mapping the things or mapping our experiences. It is the map itself. The ability to put the things in the map or map our experience can come only with understanding the social practices in whose context the mapping is actually done. Since a map cannot be used or comes to be improperly used without knowledge of the relevant rules, and thus the map is organically related to the rules which guide its use, language is constitutionally related to the social practice. Hence language is a social institution and the objects of perception (physical objects included) which cannot exist outside the theoretical framework have an indispensible social dimension.

4.6 The Grounds of Objectivity of Perceptual Knowledge

It may be argued that perceptual knowledge as characterised by us lacks objectivity since it is supposed to be theory-embodied and since the theoretical framework is a human product. Such an argument overlooks the fact that the theoretical framework is itself objective in the sense that it is inter-subjectively shared. It is because of this intersubjectively shared cognitive map and the public agreement regarding some truths which such a sharing involves that the perceptual claims of a particular individual undergo what Berger and Luckmann call "anonymisation."[1]

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1. The Social Construction of Reality, p.37.

That is to say, they do not belong to the personal orbit of an individual. The anonymisation would be impossible without intersubjective or public sharing of the theoretical framework. Further, it is because of the anonymisation that others can be keepers of my epistemological conscience. Ludwig Feuerbach long ago candidly expressed this truth when he said "what I see myself I doubt: only that is certain which another sees."[1] The idea of publicity in the sense of intersubjectivity is so central to our perception that, as Feuerbach points out, "An object, a true object, is given me only when a being that affects me is present, when my own activity - if I proceed from the standpoint of the thinker, finds its limit, its resistant, in the activity of another being. The idea of an object is ...nothing other than the idea of another I."[2]

Thus, what lends perceptual knowledge the credentials for objectivity is the intersubjectively shared theoretical framework with its adequacy to meet the practical needs inter-subjectively felt practical needs. The question of whether a particular perception s objective or otherwise

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1. Quoted by Kamenka, Eugene <u>The Philosophy of Ludwig Feuerbach.</u> 1970, p.101.

2. <u>Die Philosophe zur Zukundft</u> ed: Ehrenberg. H. in Frommans Philosophae Taschenbucher. Stuttgart 1922, p.68.

can be raised only within the conceptual scheme. For, as Hamlyn points out, "to ask whether something is objective is to ask whether it is objective as such and such."[1] Therefore the search for absolute objectivity i.e., objectivity outside the theoretical frame work is misplaced and as we have seen, futile,

So far our talk about 'perception' has been mostly in general terms. What we have characterised as the theoretical framework is so broad that it ranges from mere having concepts to having specific knowledge which constitutes what Hanson terms as "seeing as" or what Ryle calls "perceptual recipe". An explication of the notion of perception, however, remains hopelessly inadequate if it does not illuminate at least broadly, the various senses of 'see' or 'perceive'. An attempt to broadly discriminate between different senses of 'see' should enable us to understand the specific and precise way in which the theoretical framework determines seeing in its various facets. Although 'seeing' is an achievement verb, we may, nevertheless distinguish between its two senses, one, in which we can sensibly speak of its success or failure and two, in which we cannot. 'Seeing' in the latter sense

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1. Theory of Knowledge, p.72.

can be called, using Warnock's term "simple seeing,"[1] where seeing is essentially an exercise of a "physical capacity (and not) of wits, skill, faculty of experience."[2] Seeing in this case does not involve any acquired abilities such as to identify, recognise, name, describe and so on. But at the same time simple seeing is not a task or a process of having experience. It is what Ryle calls "a terminus",[3] or "the result of acts, operations, exertions or performances."[4] Therefore, 'seeing' even in the sense of simple seeing seems to be an achievement concept. 'Seeing' in the former sense is an achievement-concept _per se_ in the sense that it is not just a terminus of a process. Its use implies an application or misapplication of a "perceptual recipe". That is, when 'seeing' is used in the former sense it implies the application of the ability to recognise, identify, describe etc..

Therefore, central to seeing, is 'categorisation'. If categorisation is done properly we have a successful case of seeing; otherwise, we have seeing-failure (like illusion and other non-hallucinatory mistakes). To categorise an object seen is to place it in a class. Since all concepts do not

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1. "Seeing" _Proceedings of the Aristotelian Society_, Vol.LX (1954-55), p.201.

2. Ibid, p.217.

3. "Sensations" _Contemporary British Philosophy_ ed: H.D. Lewis Allen & Unwin, 1966, p.442.

4. _The Concept of Mind_, Hutchinson, 1949, p.151.

refer to the classes of objects all concepts cannot be categorised and that is why simple seeing is possible. Categorisation is the application of perceptual recipe which constitute our knowledge about the 'looks' of things under ordinary and normal circumstances. A statement about the 'looks' of things is a descriptive hypothetical statement concerning what it would be like to see the object in question. Apart from this pictorial aspect, the categorisation has a linguistic aspect too, since these categories or recipe have labels. As Soltis points out, "The pivot in this relationship ...between the pictorial and verbal aspects of knowledge entering into seeing would seem to be the labelling of what is seen. Though verbal, the label is that which classifies or categorises the look of a thing, thus merging the pictorial and verbal."[1] When we perceive an object or an event. We, therefore, go beyond what is observed or expereienced and identify the object or event in question as belonging to a class. It is through this categorisation that "seeing that" freely enters into seeing-knowing amalgam.

Before we proceed any further, let it be made explicit that although our remarks are made in the context of one specific form of perception namely, visual, they nevertheless are applicable to other forms as well.

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1. op. cit. p.103.

4.7 The Relation between Perceptual Knowledge and Experience

In this section, we shall explicate the relation between perceptual knowledge and experience. In doing so, we explicate the nature of categorisation in perception. In this connection, we find Bruner's "Learning Model" immensely illuminating.

Bruner's learning model or input-output model embodies a process of unconscious categorical inference by which the input is converted into the final end product of experience as we understand. Thus, according to Bruner, it is through the process of categorisation an organism"responds by referring the (appropriate) input to some class of things or events."[1] But, how are we guided in placing the input under a category? "On the basis of certain defining or critical attributes in the input, what are usually called cues although they should be called clues...there is a selective placing of the input in one category of identity rather than another."[2] Along with the cue-utilization, another factor which guides our categorisation is category accessibility which means that the categories vary with regard to the readiness with which they are used by the agent of perception in categorising the input. The accessibility of the categories depends upon

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1. "On Perceptual Readiness" Readings in Perception ed: Beardslee, David, G and Wertheimer, Michael D. Von Nostrand Company, Inc. 1958, pp.686-7.
2. Ibid, p.687.

our expectation regarding the occurrence of events of existence of things in a given situation and also our requirements imposed on us by our needs and on-going enterprises.

Perception, therefore, involves learning (1) of cues for placing objects in a system of categories (2) of various expectations about what objects are likely to occur in a given environment and (3) of appropriate categories. Application of these is indispensable for the process of inference without which categorisation is inconceivable. Hence, according to Bruner, perception is both categorical and inferential in nature.

We have spoken of conceptual framework being of the nature of a web or a network. This point is further emphasized by Bruner. He points out, "categories are not isolated. One has a category...but it is embedded by past learning in a net work of concepts....though we speak analytically of separate or isolated categories as being accessible to inputs, it is quite obvious that category systems vary in accessibility as a whole."[1]

It may be argued that by adopting the "input" and "stimulus" idiom, we are reverting back to the same term of sense-datum theory. It might be noted, however, that according to

1. Ibid, p.696.

sense-datum theory the genuine categorisation succeeds the "given" or "input" whereas for Bruner, the categorisation starts along with the reception of the input i.e. the input itself is, in a primitive way, a product of a categorisation. This is an important difference in the sense that it marks a significant departure from the sense-datum approach in particular and empiricist or subjectivist approach in general. Bruner says that the primitive categorisation is a "process that results in the perceptual isolation of an object or an event with certain qualities." And further that "an environmental event..... (is) perceptually isolated and ..... the event is marked by a certain spatio-temporal qualitative characteristics. The event may have no more "meaning" than that is an "object" a "sound" or a "movement".[1] It is interesting to note that Bruner acknowledges that it was Kant who first explicitly recognised that certain unities and identities within perception must be innate and not learned.[2] Moreover, categorisation proper is preceded by cue-utilisation which involves isolating certain characteristics of an object or event; and this process of utilisation of cues needs learning and thus it is a theory-laden activity. Therefore, in Bruner's scheme, "all perceptual experience is necessarily the end product of a categorisation process."[3]

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1. Ibid, p.697.
2. Ibid, p.689.
3. Ibid, p.688.

One can say that the soft-wear of the machine which makes possible the categorisation is nothing other than ordinary language. That the perceptual mechanism is self-adaptive is clear from the fact that we see distinctions in reality through the distinctions in language. And incorporate in our language the distinctions we are able to make in reality. These two faces of the same adaptive processes assume the status of the fundamental principles in Austin's linguistic phenomenology wherein we are called upon to see distinctions in reality through the distinctions in language and bring in distinctions in language through our seeing distinctions in reality. It should be noted that even when we make distinctions in reality to incorporate them in our language, we are not encountering an a-linguistic reality. For even that reality is determined by the broad structure of the natural language. It is through this process of adaptivity that perceptual knowledge grows, though, as we shall see, the radical shifts in the world-views effected such qualitatively different changes in perceptual knowledge that these changes cannot be conceived in terms of adaptivity. A few words concerning the latter mode of development of perceptual knowledge are in order.

But the role that language or its learning plays in unifying and ordering our experience is itself made possible by our beliefs since, as Feyerabend points out, "the firmness, the solidity, the regularity of usages are a function of the firmness of the beliefs held as well as the needs that these beliefs satisfy."[1] The totality of these beliefs or rather what unifies into a thread the various fibres of these beliefs is called the "ideology" of a miliue. To quote Feyerabend again, "what is regarded as the "firm ground of language" is usually that part of ...language that is closest to the most basic ideology of the time and expresses it most adequately."[2] The power and pervasiveness of ideology or world-view of a miliue is evident from the fact that almost any practical action is relevant to that world-view, also, almost any experience confirms it (of course, within that millieu) since the character of the concepts and therefore, of language which is their "natural home" are themselves determined by that world view. In other words, to one who partakes of a particular ideology it can, on the one hand, explain almost any entity, event or situation conceivable by him and on the other hand that world-view and the beliefs which that world-view unites seem to be entailed by his "indubitable"

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1. "Problems of Empiricism" Beyond the Edge of Certainty ed: Colodny, R. Englewood Cliffs, N.J. 1965, p.224.

2. Ibid, p.224.

experience. Since, commonsense or ordinary perceptual knowledge invariably needs some world-view, it is, as Meyerson points out, "only a more or less artificial halting place on a constantly sloping decline."[1]

What has been said above can be concretely seen if we look at two world-views namely, the 'mythological world-view' and what can be loosely characterised as the 'naturalistic world-view' which have sequentially guided man's perceptual experience. Within the scheme of the mythological world-view there is no distinction between the realm of nature and the realm of man. The natural phenomena are conceived in human terms and the human experience in cosmic terms. In the mythological world-view of primitive man, nature is always a "Thou" as opposed to the naturalistic world-view in which nature is always an "It".[2] Confrontation of man with nature, in primitive world, is an encounter of life with life. In the words of Crawley, "Primitive man has only one mode of thought, one mode of expression, one part of speech - the personal."[3] The personal character of man-nature relation

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1. ~~op. cit.~~ Identity and Reality, Dover, New York 1962. p.365.
2. cf. Frankfort, Henri. "Before Philosophy: The Intellectual Adventure of Ancient Man, Penguin, 1949, Chapter 1.
3. Quoted in Frankfort, Henri, "Before Philosophy", p.14.

accounts for the absence of autonomous role of intellect in primitive man's perception of nature and consequently the absence of subject-object distinction. The seminal distinction between the "Thou" conception and 'It' conception of nature is reflected in the conception of causality. As we have pointed out the concept of cause is part and parcel of the theoretical framework in and through which alone we perceive objects. Not only our theoretical framework has causal concept as its part, but, "primitive thought (too) naturally recognised the relationship of cause and effect, but it cannot recognise our view of an impersonal, mechanical and law-like functioning of causality."[1] Since nature for the primitive man is not lifeless, its mechanical and law-like workings are unthinkable for him. Moreover, our understanding of phenomena as manifestations of general laws could not do justice to individual character of events which precisely what the primitive man experiences most intensely. Hence, though causal concept is common to the perceptions of primitive man and ourselves, the character of the concept is determined by the differing world-views.

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1. Ibid, p.24.

The naturalistic world-view is characterised, by the emergence of subject-object distinction within which only the genesis of science are to be sought. Hence, in the corpus of naturalistic world-view perception is determined by the character of the science at different stages. For instance under the shadow of Aristotelian science, physical objects were conceived to be having rest as their natural state. After the emergence of Newtonian science with its conception of inertial motion, the idea of rest as a natural state was given up.

However, when the transition from mythological world-view to the naturalistic one occurred, it did not take place on the basis of sense-experience. For, the sense-experience itself was supposed to entail the primitive world-view. In fact, the so-called experience itself needed emancipation from the old world-view -a task which needs the new world-view to be accepted beforehand. It is precisely this dialectical mode of development which characterises, as we shall see, the growth of scientific knowledge. The question what motivates the dialectical development of human knowledge is the question to which we shall turn at the end of the dissertation.

PART II SCIENTIFIC KNOWLEDGE

CHAPTER 5

NON-REALIST THEORIES OF SCIENCE

In this chapter and the one following it we shall discuss the nature of scientific knowledge. As we have seen, the philosophical problem of perceptual knowledge is concerned with the character of propositions about physical objects and the relation between the propositions concerning physical objects and those concerning sense-experience. Analogously, the philosophical problem of scientific knowledge relates to the nature of scientific theories and the relation between the theoretical statements and the observation statements. The problems relating to the latter, when expressed in the material mode of speech, turn out to be the problems concerning the cognitive status of the theoretical entities and their relation to observable entities or facts.

Whereas according to the realist philosophy of science the theoretical entities have a substantive reality of their own, the non-realist philosophy of science deny the theoretical entities any ontological status, substantively speaking. According to the non-realist view, the reality of the theoretical entities is irrelevant to the actual scientific activity.

The important non-realist theories can be classfied as (1) Descriptivism (2) Instrumentalism and (3) Conventionalism. Descriptivism maintains that a theory is nothing but a summary of observation statements it covers. Theoretical entities do not have independent existence apart from the data of observation. Thus, according to descriptivism, the aim of science is to provide shorthand descriptions of phenomena. Instrumentalism, on the other hand, essentially asserts that the theories are only inference-tickets or tools for prediction, In the instrumentalist scheme, the question of theories being true or false, therefore, simply does not arise; theoretical entities are only convenient myths or conceptual devices. According to instrumentalism, the aim of science is prediction of phenomena. Conventionalism, in contradistinction to the above two views, regards scientific theories to be nothing more than pigeon-holes. in which facts are organised into some coherent whole. The conventionalist does not regard any pigeon-hole system as provenly true but only as 'true by convention' (or, possibly even as neither true nor false). Since a scientific theory is supposed to be conventional in character, the reality of the theoretical entities for all purposes, is non-substantial. The aim of science, according to conventionalism, is systematization of phenomena.

As was pointed out earlier, not all non_realist views are empiricist in character. The descriptivist view which reduces theoretical statements/terms to observation statements/terms is an undiluted version of empiricism. The conventionalist view is tenuously related to empiricism. That is to say, its view about the cognitive status of the theoretical entities is not totally based upon the notion of the given or pure observation. The instrumentalist view has both empiricist as well as non-empiricist strands. In other words, whereas some instrumentalists base their view on the idea of pure observation, some do not.

Thus, the non-realist position has two versions, namely, the empiricist version represented by descriptivism and some forms of instrumentalism and the non-emprircist version represented by conventionalism and some forms of instrumentalisms.

Using Popper's distinction between active and passive theories of knowledge,[1] we can characterise the empiricist version of non-realism as passive since the idea of given is central to it. The non-empiricist version of non-realism in so far as it considers scientific theories to be free creations of human mind can be characterised as active.

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1. The Open Society and Its Enemies, Vol.2, Routledge and Kegan Paul, 1966.

It should be borne in mind that the issue between realism and non-realism concerning the cognitive status of the theoretical entities is not just verbal. Nagel is wrong when he says, "The opposition between these views is a conflict over preferred modes of speech."[1] On Nagel's interpretation it would mean that the issue is not about reality but about language. Such an interpretation itself presupposes an instrumentalist view of theories in general. Moreover, assuming that Nagel is right in his interpretation it would appear that philosophers of science qua-scientists can reject a scientific theory only on account of linguistic clumsiness and not on account of its ontological implications. However, the important non-realists like Bohr repudiate the philosophical basis of classical physics not on the ground of linguistic clumsiness but because classical physics is said to involve undesirable ontological consequences. Hence, the dispute between realism and non-realism is substantial and not linguistic.

5.1 The Empiricist Version of Non-realism

The empiricist version of the non-realist philosophy itself, as we have seen, can be either of instrumentalist or descriptivist variety. Thus, Ayer holds that "the hypothesis may ...be described as rules which govern our expectation of future experience."[2] The central thesis of descriptivist

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1. The Structure of Science, Harcourt, Brace and World, New York, 1961, p.152.

2. Language, Truth and Logic, p.129.

view has been succinctly expressed in the words of Mach: "The communication of scientific knowledge always involves description, that is, a mimetic reproduction of facts in thought, the object of which is to replace and save the trouble of new experience. Again, to save the labour of instruction and of acquisition, concise, abridged description is sought. This is really all that natural laws are. Knowing the value of the acceleration of gravity, and Galileo's laws of descent, we possess simple and compendious directions for reproducing in thought all possible motions of falling bodies. A formula of this kind is a complete substitute for a full table of motions of descent because by means of the formula the data of such a table can be easily constructed at a moment's notice without the least burdening of the memory."[1] In the same descriptivist vein, Niels Bohr says, "the task of science is both to extend the range of our experience and to reduce it to order."[2] Similarly, according to Hempel, "Science is ultimately intended to systematize the data of our experience."[3]

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1. Quoted in Nagel, op. cit. p.121.
2. Atomic Theory and Description of Nature, Cambridge Univ. Press, 1934, p.1.
3. Fundamentals of Concept-formation in Empirical Science The Univ. of Chicago Press, 1965, p.21.

Since the descriptivist view is an undiluted version of empiricism, in this section the focus of our attention on the descriptivist variety of the empiricist-non-realist view of theoretical entities. But first we shall examine the central notion which underlies both varieties of empiricist-non-realist view, namely, the notion of theory-free or pure observation. It is on this notion that the empiricist idea of unilateral dependence of theory over observation rests. The ideas of autonomy of observation and primacy of observation over theory are so central to empiricism that even a liberal empiricist view like that of Carnap who, unlike instrumentalists, concedes truth-value to the theories and, unlike descriptivists, grants some autonomy to the theoretical statements does not compromise on the issue of one-sided dependence of theory on observation. The meaning of primitive, descriptive terms, according to Carnap, can be completely accounted for "by pointing to the fact that some of these are connected with observational terms."[1]

We have shown, in Chapter 2, the impossibility of "theory-free" or "pure" observation in an absolute sense.

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1. "The Methodological Character of Theoretical Concepts" _Minnesota Studies in Philosophy of Science_, Vol. 1, p.47. [1956].

Here we shall endeavour to show the impossibility of "pure" observation even in a relative sense. We first begin by showing the logical difficulties that the idea of relatively theory-free observation encounters and then show that the history of science speaks against it.

One can distinguish between two senses of "relatively theory-free observation or observation statements": (1) the sense in which observations depend upon a theoretical framework which is so broad that it can be a common ground for an evaluation of all the scientific theories that need testing, and (2) in the sense that given a particular theory, T_1, we can always have observation statements which lie outside the framework of T_1 and thus are free from the theory under test. The first sense of 'relatively free' is least promising since the principle which provides the broad theoretical framework itself needs predictive testability which in its turn demands a broader principle to provide a neutral framework of observational language. This lands us in an infinite regress.

The second sense of 'relatively theory-free' also does not seem to fare any better. In the second sense one can always have an observation or observation-statement, O_1 such that it can be used to test T_1 since O_1 depends

upon T and not on T_1. But consider a situation where we have to choose between T_1 and T_2 and further suppose that O_1 supports T_2 and not T_1. But a supporter of T_1 might claim that O_1 is not a relevant observation or fact and that the difficulty which T_1 has with O_1 isn't big enough to warrant its rejection. "Neutral" theory like T which provides a "neutral" observational basis does not go a long way in resolving the theoretical dilemma between T_1 and T_2 since it does not settle the question of relevance. In order to resolve the question of what is relevant to a theory one has to first accept the theory in question. Added to above there is another problem. Since no theory can be totally free from all difficulties a supporter of T_1 can point to another observation or fact O_2 which might also depend upon T but which proves recalcitrant to T_2. A supporter of T_1 can go further. Since it is always possible to bring sufficient modification in a theory to suit any observation he can adapt T_1 in accordance with O_1 through suitable technical adjustments. One cannot being the criterion of simplicity against him since the idea of simplicity itself, as we shall see, unclear and vague.

It is necessary now to turn our attention to the history of scientific revolutions to evaluate the factual veracity of the ~~Instrumentalist~~ empiricist position. The need to resort

to the history of scientific revolutions is two-fold. One, the conceptual difficulties pointed out above are not by themselves sufficient to reject empiricism. An empiricist might put forward physical arguments. That is, he might rightly point to certain fruitful physical laws which can be shown to be only Instrumental in character. A realist epistemologist who cannot replace such physical laws by those which are in conformity only with a realist epistemology has no other alternative than to turn to hisotry of science and scientific revolutions with the help of which he can establish the reasonableness of the hope that the physical laws consistent only with a non-realist philosophy can be replaced by those which square with a realist view. Secondly, the study of scientific revolutions might in itself prove too rich to be grasped by the conventional and official philosophies of science. Lenin's observation about the history of social revolutions that it "is always richer in content, more varied, and more multiform and more lively and ingenius than is imagined by even the best parties, the most class-conscious vanguards of the most advanced classes,"[1] equally applies to the history of scientific revolutions. It is richer in content, more varied and multiform than is imagined by even

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1. *Left-wing Communism, An Infantile Disorder*, Progress Publishers, 1970, p.78.

the most rigorous philosophies of science, the ablest thinkers of the most advanced sciences. We focus our attention on the scientific revolution which lasted from the sixteenth century to the Eighteenth, determining the life of science till the turn of the century. Since our attempt is to work out an adequate theory of science considering science in its dynamic mould and since the dynamism in science is felt more vividly in revolutionary periods, the actual course of the scientific revolutions becomes a matter of paramount importance.

To begin, the Aristotelian law of motion in the case of falling bodies was not rejected by Galileo just because it went against the observational predictions. That a mere recalcitrant observational prediction cannot be the basis of an alternative law is clear from the fact that it was not overthrown before Galileo though it was proved to be contrary to facts. Nearly one thousand years before Galileo, Joannes Philoponous, a Byzantine scholar had shown that the Aristotelian law could not stand the experimental tests. Similarly just before Galileo, Simon Stevin, a Felmish engineer, physicist and mathematician showed the observational untenability of the Aristotelian view regarding falling bodies. But still the Aristotelian view was retained in the main body of physics. In fact, Galileo's disproving observationally the

Aristotelian law of motion for falling bodies could not have affected either the Aristotelian law itself or even the whole of physics decisively."In Galileo's day, it was hardly a great achievement to prove that Aristotle was wrong in only one respect. Pierre de la Ramee (or Ramus) had some decades earlier made it known that everything in Aristotle's physics was unscientific."[1] The question is why was it that what Galileo could do Joannes and Stevin could not though they too had proved Aristotle wrong. The answer is to be found in what Galileo did which his predecessors could not. The Aristotelian system of physics of which the Aristotelian law of motion for falling bodies was a part, "was a complete system of physics developed for a universe at the centre of which earth was at rest; hence to overthrow that system by putting the earth in motion required a new physics,"[2] just as the new physics needed the earth to move. The organic relation between the Aristotelian law of motion for falling bodies and his system of the universe could be seen clearly in the words of Ptolemy who in his 'Almagest' the standard work in Aristotelian tradition of geo-centric astronomy, writes that if the earth had a motion "it would, as it was carried down, have got ahead of every other falling body, in virtue of its enormous excess of size, and the animals and all separate weights would have been left behind floating

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1. Cohen, I.B. The Birth of a New Physics. Vakils, Feffer and Simons Pvt. Ltd. 1965 p.96.

2. Ibid, p.19.

on the air, while the earth, for its part, at its great speed, would have fallen out of the universe itself."[1] Clearly, this follows only on the assumption that speeds with which the bodies move are proportional to their respective weights.

But was the new system of physics, viz. the heliocentric physics itself thoroughly based on observation? In fact it was the Aristotelian physics which was more true to ordinary observations than the new one. The problems of inconsistency with experimental results were not altogether beyond the realisation of the Aristotelians and they were attempting to explain them keeping the basic theory intact. The inaccuracies of the calender could have been got rid of by using additional epicycles. What is more important, "the new observations that were made assumed the decisive character ascribed to them only for the believer in the new astronomy; they were irrelevant, beside the point, or perhaps even unnoticed by the Aristotelians."[2] They had every right to reject the recalcitrant experimental tests as irrelevant if they could not be interpreted within the terms of their theory since there is no neutral cirterion of relevance.

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1. Quoted in Cohen, I.B. "The Birth of a New Physics, p.35.
2. Feyerabend P.K. "Problems of Empiricism" Beyond the Edge of Certainty ed: Colodny, R. Englewood, 1965, p.153.

This is not to say that the old view did not suffer from any difficulties. But the difficulties that beset it did not outnumber the difficulties of the new theory.

Therefore, mere observations could not give sufficient basis for the new physics. That ordinary, innocent observations went against it is clear from the words he puts into Salviati, the mouthpiece of Copernicus and Galileo himself: "They (the copernicans) have through sheer force of their intellect done such violence to their own senses as to prefer what reason told them over that which sensible experience plainly showed them to be the contrary...there is no limit to my astonishment when I reflect that Aristarchus and Copernicus were able to make reason so conquer sense that in defiance of the latter, the former became the mistress of their belief."[1] From this it is clear that Galileo had totally realised the counter-productive character of direct observations. In fact "(The belief) that Galileo discovered the law of squares by performing with falling bodies a number of measurements of distance time noting in these values the constant ratio between the distance and the square of time...is flagrantly contradicted by all that is known about the degree of importance

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1. Dialogue Concerning the Two Chief World Systems, Tr. Drake, Stillman, Univ. of California Press, Berkeley and Los Angeles, 1962, p.328.

that Galileo attached to scientific experiments."[1] In fact, Galileo goes to the extent of saying, "I, without observation, know that the result must be as I say, because it is necessary."[2] It is necessary to note that "Galileo takes pains to demonstrate that the hypothesis of the rotation and revolution of the earth is not refuted by the fact that we do not observe any mechanical effects of these motions. Strictly speaking, such a demonstration was impossible because a complete theory of mechanics was lacking."[3] Moreover, the arguments which Galileo put forward in support of the new system were only of a "qualitative" nature. A strong support over and above qualitative arguments could have come by determining the 'true orbits' of the planets. Kepler's ingenius efforts at this stupendous task were not taken seriously by Galileo - "a grotesque illustration of the fact that creative individuals are often not receptive."[4]

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1. E.J. Dijksterhuis The Mechanisation of World Picture Translated by Dikshoern C. Oxford Univ. Press, 1961,p.340.

2. Quoted in I.B. Cohen's The Birth of A New Physics, p.94.

3. Einstein Albert, in his foreward for Dialogue Concerning the Two Chief World Systems, Tr. Drake, Stillman, Univ. of California Press, Berkeley, 1962, p.xvii.

4. Einstein, Albert, Ibid, p.xv.

It is because the 'observations' then prevalent could not support him but instead stood against him that Galileo resorted to the telescope. It would be historically unjust to say that his opponents without giving any reason refused to look into the telescope. On the contrary they had sufficient reason not to go by what it revealed at least so far as the purpose of Galileo was concerned. His opponents did not have any objection to using the telescope in the case of terrestrial phenomena. But they held the belief that celestial and terrestrial objects were made of different elements and therefore the telescopic results of the interaction of light with terrestrial objects could not be automatically extended to the sky. Further, they had an epistemological reason for their stand, namely, that the distortions and disfiguring of coloured fringes of the telescopic images could be detected in the case of terrestrial vision since our senses are acquainted with the terrestrial objects and this is impossible in the case of celestrial objects. The familiar cues like background and neighbourhood which essentially aid our terrestrial vision are absent in the sky.

But all these difficulties could have vanished had Galileo possessed an adequate theory of optics. In fact Galileo had no such theory. He was unaware of Kepler's

theory of optics developed in 1604. The one developed by Kepler in 1611 was as inadequate as the earlier one and even this highly inadequate theory Galileo found so difficult that he says "perhaps its own author had not understood it." Even as late as 1640, he confessed that so far as he was concerned the nature of light was till in darkness. Of course ultimately he built the new system on the basis of the telescopic phenomena viz, the telescopic variations of the brightness of some planets which agreed more with the Copernican view than the observations by the naked eye. But in doing so he was guided by the faith in the reliability of the telescope and the possibility of developing an adequate theory of vision justifying telescopic observations. As Ludvico Geymon rightly points out, "In Galileo's own mind, faith in the reliability of the telescope and recognition of its importance were not two separate acts; ...rather, they were two aspects of the same process."[1] Moreover, the so-called telescopic observations was not only parasitic upon the new theory of optics yet to be provided, but could not be considered to provide a basis or full-fledged positive evidence for the Copernican view. It was only a rough support to push through the theory. The future success of the theory establishes the validity of Galilean

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1. Quoted by Feyerabend, P.K. "Problems of Empiricism II" The Nature and Function of Scientific Theories ed: Colodny, R.G. Univ. of Pittsburgh Press, 1970, p.290.

approach. He realised that the acceptance of the new theory was needed in order to develop an appropriate observational language. As de Santillana points out, "Against the principles of the conventional cosmology which were always brought against him, he needed an equally solid set of principles indeed, more solid because he did not appeal to ordinary experience and commonsense as his opponents did."[1] In other words, it is further auxiliary sciences or theories and not newer observations that he needed. The principles or theories needed to be established were:

1. The principle of Inertial motion which presupposes (a) the possibility of separating a physical body from its surroundings (b) the conception of infinite space and (c) a conception of movement and rest according to which both motion and rest are states and are placed on the same ontological footing.
2. a theory of optics which would strengthen the observational language.
3. a new metereology.
4. a new dynamics explicating in a way demanded by the new system, the influence of earth's motion on the physical processes. This new theory of dynamics was to replace our ordinary ideas which are inadequate to explain the observed facts of daily experience on a moving earth and thus develop emancipated observation language.

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1. The Crime of Galileo, Chicago Univ. Press, 1965, p.31.

But the basic and prior condition for all this theoretical development is the acceptance of copernican view as a description of reality rather than as mere instrument of prediction. That is why Galileo did not consider "his thought the empiricist outcome of industrial division of labour or advanced technology or book-keeping or whatever gadget it is that amateur sociologists have devised for his rationale. He felt he had to face the central issue: To the well worked out cosmos of his predecessors he opposed another cosmology, another way of knowledge."[1] It is the realistic interpretation of the theory that encourages research for the development of the auxiliary theories which in turn develop a sufficient observation language and thus enrich the theory itself.

It follows from the detailed consideration of the scientific revolution for which Galileo worked as a catalyst that an observation language which might lie outside the theory in question might remain degenerate and thus in no way help the theory. It might even retard the growth of a healthy theory. So a new theory has to be developed not on the basis of such an observation language, but in spite of the contradiction between the observations and the

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1. Giorgio de Santillana "Galileo In the Present" Homage to Galileo ed: Morton Kaplon, The M.I.T. Press, 1965, pp. 16-17.

theory. It is futile and even dangerous to rely on observations which depend upon a degenerate theory. Secondly, we need not wait till we get a fullfledged support from observations. For such a fullfledged support is possible only when the observations are sharpened by auxiliary theories which in turn need an acceptance of the main theory. Once all the auxiliary theories are developed we can emancipate the observational language from its degenerate character because of which the observations could not support the theory in the beginning. This is precisely what happened to the observational language which was based on a degenerate theory like the geocentric view.

It is interesting to note that even the failure of Galileo in developing these auxiliary theories are to be traced to theoretical reasons rather than to his lapses in observations. As Koyre points out, "it is only his reluctance to discard completely and radically the experimental data for the theoretical postulate he worked so hard to establish, that prevented him from making the last step on the road which leads from the finite cosmos of the Greeks to the infinite universe of the moderns."[1] Along with this, clinging to

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1. Metaphysics and Measurement, Chapman and Hall, 1968, p.2.

whatever observations he had made, it is due to his obsession with the ancient belief in circular motion as the truly natural one and also a wish to avoid the consequences of an infinite space that he failed to develop the principle of Inertia.

All these points go against the basic contention of empiricism regarding the theory observation relation which if adopted by thinkers like Galileo science would have been where Aristotle and Ptolemy left it. For, as Einstein points out, "the experimental methods at Galileo's disposal were so imperfect that only the boldest speculation could possibly bridge the gaps between the empirical data... His endeavours are not so much directed at factual knowledge as at comprehension."[1]

Till now we examined the logical and historical tenability of the empiricist conceptions of pure observation and unilateral dependence of theory on observation. In what follows, we will look into the descriptivist view in greater detail through two of its representative versions. We shall consider Newton as representing descriptivism in the Grand Tradition and Mach as its formalist (or quasi-formalist)

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1. Op. cit. p.xix.

representative.

Epitomising his descriptivist position in the General Scholium of Principia, Newton asserts,

> "What is not deduced from phenomena is to be called a hypothesis; and hypotheses, whether metaphysical or physical, whether on occult qualifies or mechanical, have no place in experimental philosophy. In this philosophy, particular propositions are inferred from the phenomena and afterwards rendered general by induction." 1

In what follows we shall see how Newton's own scientific practice violates everything that is said in the above quote. Einstein's exhortation to learn about science not on the basis of what the scientist says he does but what he does[2] appears most relevant in the case of Newton.

First of all it is interesting to note the way "the particular propositions are inferred from the phenomena." The so-called phenomena are not pure and simple facts or observations. The observation statements or statements concerning phenomena are expressed in property terms that are defined in such a way that properties involve continuous

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1. Edi Cajori, Florian. Univ. of California Press, Berkeley 1934, p.574.
2. "On the Method of Theoretical Physics" <u>Ideas and Opinions</u> Crown Publishers, New York, 1954, p.270.

variation and thus can express regularities. Secondly, the experimental statements are formulated in a mathematical language. Thus, as Feyerabend points out, "They are rather an intimate synthesis of laws, possessing instances in the domain of the senses and certain mathematical ideas. The synthesis is so close that the division into the elements "law", "instances", "mathematical ideas" can be carried out only abstractly and only by comparison with quite different points of view."[1] Therefore "laws" or "particular propositions" can be inferred from "experience" because their basis is woven into the "experience" itself.

The statement expressing Newton's descriptivist position was made by him in the context of his law of universal gravitation which was introduced by him as if it were a direct consequence of his own inductive rules of procedure acting on Kepler's laws which were supposed to be only records of pure facts or observations regarding planetary motions. It is because of this that many thinkers including Hegel who denied to Newton any discovery over and above those of Kepler were misled into thinking that Newton's law of gravitation was only a mathematical transcription of Kepler's laws which expressed nothing but the "given". Duhem's historical research

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1. "Problems of Empiricism" Beyond the Edge of Certainty ed. Colodny, Robert. Eaglewood Cliffs 1965, p.159.

and Einstein's General theory of relativity eventually led to the realisation that a distorted picture of the actual situation had held captive the historians and philosophers of science. As Einstein says: (since) "we can point to the two essentially different principles (such as Newton's theory of gravitation and the general theory of relativity)... every attempt at a logical deduction of the basic concepts and postulates of mechanics from elementary experiences is doomed to failure."[1] This means that neither is a theory inductively derivable from the "empirical" laws not are the theoretical concepts used in the body of a theory simply abstracted or derived from the observations or observed entities or events. It is evident that Newton introduced the idea of force in explaining Kepler's laws by deriving them from his laws of motion and his law of gravitation and in providing a synthetic account for the motion of the planets in the solar system on the one hand and of falling bodies near the surface of the earth on the other. The transcendental character of the Newtonian theory could have been brought into philosophical focus had the idea of force was retained at the ontological forefront. Positivists like Mach, Clifford, Kirchhoff, Hertz and others in their attempts to deontologise force heavily contributed to the

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1. Op. cit. p.274.

perpetuation of the myth that Newton's theory of gravitation was derived from observation statements, that is, Keplerian laws.

We shall see now whether Newton denied any place for hypotheses, metaphysical or physical, on occult qualities or mechanical.

In a letter addressed to Boyle Newton gave vent to his speculations regarding the "cause of gravity", and the attempts to explain gravitational attraction by the operation of an all-pervading "aether". However, the anti-positivist scientific practice of Newton is most conspicuous in the way in which he introduced and looked upon on his conception of absolute space. Absolute space for him is an ontological necessity, being logically demanded for the validity of the first law of motion. Without it the rectilinear uniform motion and the state of rest are inconceivable. As Jammer rightly points out "If Newton had been a confirmed positivist he would have acknowledged all uniformly moving inertial systems as equivalent to each other. As it was, only one absolute space existed for him."[1] Given the basic ontological entities of his conceptual system to be atomic rather than field-theoretic, absolute space could not have been wished away. The realisation that "Space must be introduced as the independent <u>cause</u> of the inertial behaviour of bodies if

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1. <u>Concepts of Space</u>, Harvard Univ. Press 1954, p.100-1.

one wishes to give the classical principle of inertia (and therewith the classical law of motion) an exact meaning...is...one of Newton's greatest achievements... space is not only introduced as an independent thing apart from material objects, but also is assigned an absolute role in the whole causal structure of the theory."[1] It is to be noted that the very ideas of cause and space as a cause and that too an absolute cause are the very negation of the positivist mode of theorising.

Another metaphysical conception which enjoyed Newton's commitment is atomism. As we know the nineteenth century produced against Newton's corpuscular theory of light a succession of brilliant researches whose beginning is marked by the revival of Huygens's wave theory by Thomas Young. The research was continued by Fresnel and Arago, followed by Clerk Maxwell's electromagnetic theory which derived partly from the extension by Maxwell of Faraday's ideas concerning propagation of electric and magnetic effects through space. Maxwell's towering contribution brought to fruition the process that was started by Young at the turn of the century. But Young himself was indebted to Newton not only for the data for computing wave-lengths,

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1. Einstein A. Foreword: Ibid, p.xiv (Emphasis added)

numbers and frequencies but for the decisive suggestions in Newton's Optics in developing wave theory itself, which Young developed with some additional principles, mainly, that of interference. Young says, "A more extensive examination of Newton's various writings has shown me that he was in reality the first that suggested such a theory as I shall endeavour to maintain."[1] Not only does he demonstrate the truth of his declaration of indebtedness to Newton but even goes to the extent of admitting that he discovered the crucial principle of interference (by which alone the wave theory could overcome the difficulty regarding periodicity) "by reflecting on the beautiful experiments of Newton."[2] The question is why did Newton reject wave theory which scientists like Young attributed to him? As Cohen rightly points out, "Foremost among the reasons why Newton insisted upon the corpuscularity of light was the general atomism of the age... whereas the scholastic doctrine had placed light and the phenomena of colours in the category of "forms and qualities", men such as Newton opposed to this traditional view an explanation of the phenomena of nature in terms of the mechanical action of atoms or of matter and motion."[3]

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1. Quoted in Cohen's Preface to Optiks Dover, 1952, p.xlii
2. Ibid, p.xliii.
3. Ibid, p.xliv.

When Newton faced the choice between the two rival theories both of which had grounds in his experimental "phenomena", he did not suspend judgement as a pious empiricist would do. The grip of the atomistic metaphysics was too strong to allow him to conduct a crucial experiment much to the telling indictment by empiricism. His natural philosophy thus gave a place for a metaphysical hypothesis which he candidly voiced when he said, "God in the Beginning formed matter in solid, massy, hard, impenetrable, movable particles, of such sizes and Figures, and with such other properties and in such proportion to space, as most conductive to the End for which He formed them."[1]

Huygens' wave theory was rejected by Newton on one more ground. As against Newton's corpuscular theory, Huygens' theory was geometrical rather than mechanical. Thus along with a metaphysical hypothesis, viz. atomism, one finds a mechanical hypothesis flowing under Newton's rejection of wave theory in favour of the corpucular one. But a more telling effect of the mechanical hypothesis is found in Newton's unsuccessful attempts to give deeper explanation for gravity. He did not accept the possibility of gravity being an innate and inherent property i.e. as an essential property of matter. For he shared with the

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1. Quoted in Cohen Ibid, p.xlv.

Cartesians the belief that only extension (and also mass, in the case of Newton) could be considered as innate, a status denied to the relational properties like gravity. He was convinced that "that Gravity should be innate, inherent and essential to matter, so that one body may act upon another at a distance...is to me so great an absurdity that I believe no man who has in philosophical matters a competent faculty of thinking can ever fall into it."[1] Newton in order to provide an explanation of gravity attempted, in vein, to deduce the square law from the assumption of a mechanical push since it was the only legitimate causal connection within the cartesian framework. Cartesians had legitimised only the "mechanical push" causal connection because it could be explained by extension which was taken to define matter.

To conclude, "hypothesis non fingo" never worked as a guiding principle in the case of Newton. For Newton was a part and parcel of an epoch which gave birth to modern science and which, as de Santillana puts it, "first took metaphysical commitment seriously. This may sound paradoxical, for the middle ages are supposed to be the age of metaphysics. But it was a very different thing, based on the inscrutable will of God, operating inductively from hints of that absolute will."[2]

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1. Letter written to Richard Bentey on 25th Feb. 1693, Quoted in Popper, Karl. Conjectures and Refutations, Routledge and Kegan Paul, London, 1972, pp.106-7.
2. "Galileo In the Present" Homage to Galileo ed. Morton Keplan. The M.I.T. Press, 1965, pp.20-21.

We shall now briefly deal with the Descriptivist view of Mach who hopes "that the science of the future will discard the idea of cause and effect as being formally obscure; these ideas contain a strong mixture of fetishism."[1] He reduces force and mass to purely mathematical expressions relating certain measurements of space and time. He tried to eliminate force altogether from dynamics without any loss of empirical content. According to Mach, every mechanical problem can be reduced to the problem of finding the velocities, accelerations and positions of masses after the interaction, given the values of these parameters before or to the problem of retroducing the initial state of a given system of interacting bodies. In the process of being eliminated, the concepts of cause and force undergo a metamorphosis such that 'cause' looses its ontological status and assumes only a predictive significance just as force gets stripped of its ontological nature. The above programme has to reckon with the initial problem of establishing the non-ontological character of cause independent of the long discarded sense-datum myth. Further the very idea of what a scientific theory is and the meaning of 'empirical content' are taken in this programme to be self-evident. It appears that just as facts are not 'given', even theories are not 'given'.

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1. Popular Scientific Lectures, Tr. McCormach, Open Court, 1943 p.254.

In other words, the way one looks at scientific theories assumes a prior philosophical stand-point. To say that the empirical content of a theory is exhausted in terms of what the scientists do is not necessarily to say that the empirical content is exhausted in terms of predictive function of the theory. For it assumes, what can be questionable, that what scientists do is only prediction. The beliefs or hopes regarding the objective basis of the concepts they use, cannot be wished away from what they do. Unless those beliefs and hopes are shown to be totally unreasonable on independent grounds, they can very well be part of what we do with science.

However, the essential point of Mach's approach to the nature and function of scientific theories is that less we say the better. In this obsession with saying less and less, one has to see what sort of facts and questions are rejected or even silenced; whether those questions and facts make sense for us and even appear significant and this becomes a matter of primary significance in deciding the acceptability of the different points of view in our metascientific queries.

If causal relation were to be a mere fiction, an important episode in the history of Physics appears irrelevant. Beckman asked Descartes why bodies fell. As Hanson points out, "the query is itself significant: causal ideas of Gilbert

and Kepler are mixed in here."[1] Of course, bodies fall because the earth attracts them. But, why do they accelerate? Beckman tentatively answered by resorting to the earth's attraction at each instant afresh and thus conferring on them an additional degree of motion. Descartes could never conceive of such a question. For, as a geometer, he was content with his finding some relation between two sets of variables. "The line- which for Beckman (as for later Galileo) represented the square of times - is for Descartes, as for the Galileo of 1604, the trajectory of the unsupported body."[2] What Descartes could not do Galileo could do later. If cause is stripped of its ontological status, the very question of Beckman and the motivation which guided Galileo's ability to transcend the current idiom, though he left a large part of the future story to Newton,will simply melt into nothingness.

Secondly, the very idea of eliminating a particular concept from the body of a theory presupposes a picture of theory that is complete and finished. This is clearly brought out in the eliminater's refusal to trace the history of the problem which brought in the theory into existence rather than the history of a particular concept. Criticising Jammer's Machian conclusions about the idea of force in his historical research into the concept of force, Mary Hesse rightly points

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1. Patterns of Discovery, p.43.
2. Hanson, Ibid, p.45.

out that "(the) danger inherent in tracing the history of a particular concept rather than a perrennial problem (for example, "How do bodies act upon one another?"), is that its metaphysical accompaniments must seem in the end to be accidental and dispensible."[1] It is, therefore, only when concepts are treated independent of the problems in the light of which only their development can be accounted for, that the idea of eliminability of particular concepts can have a purchasing power. But this approach to the history of concepts is prima facie illegitimate or at least highly questionable.

Therefore a metamorphosis of the concepts which are candidates for elimination demands the oblivion of what are normally considered to be the major historical episodes and questions that are considered historically perennial In short, the Machian view survives only on the unsubstantiated and unargued for demand to loose the sense of history in philosophising about science

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1. "Review of Jammer's, (Max) Concepts of Force", British Journal for the Philosophy of Science, Vol.X (1959) p.71.

5.2 Non-empiricist Variety of Non-realism

As pointed out earlier conventionalism and some forms of Instrumentalism are the major non-realist views of non-empiricist variety. The view of non-realists of this variety concerning the nature of scientific theories is generally characterised as Black-boxism. In the 'black-box' scheme, scientific theories are likened to the devices in the form of boxes with external dials corresponding to the external variables representing observable entities or occurrences and the internal structure whose pieces correspond to internal or hypothetical variables representing non-observable entities or processes. If, in order to run the box, only the external dials need to be manipulated then we have a black box theory. Black-box theories thus focus on the behaviour of systems and particularly their observable inputs and outputs. Of course, black-box theories do make use of purely theoretical terms. But what is essential to them is the interpretation of all non-observable variables either as merely computational auxiliaries without any concrete reference, or as characteristics of the system as a whole. According to black-boxism all the theories of science are black boxes or at least within the gamut of science there is no need to treat them as anything more than that. Filling the black boxes with definite 'mechanisms' in order to explain why a system behaves in the way it does is neither necessary nor desirable.

Since, there is hardly any substantial difference between conventionalism and instrumentalism of the non-empiricist sort, except that instrumentalism is a "degenerate version" of conventionalism,[1] In this section we focus our attention on the conventionalist view. However, we begin by considering two customary arguments usually given in favour of instrumentalism. First, it is argued by instrumentalists that the theoretical statements in science are not actually statements but only statement-forms since some of the theoretical terms occuring in the theoretical statements are variables in the sense they are not associated with any correspondence rules. Thus, for example (a) "if the disorder of a thermodynamic system increases, then the entropy of the system increases in an exponential manner." It may be noted here that the term "disorder" lacks correspondence rule whereas "entropy" does not, as is clear from the second law of Thermodynamics which connects change in entropy with heat flow and temperature. However, the realist can obviate this difficulty by employing, as Nagel suggests, Ramsayan device of introducing existential quantifiers as prefixes to theoretical statements.[2] Thus, the above can be rendered as (b) "there exists a property W (disorder of the system) such that if W increases then the entropy of the system also increases in an exponential manner."

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1. Lakatos, Imre, The Methodology of Scientific Research Programmes: Philosophical Papers Vol I Cambridge Univ.Press, 1978, p.106.
2. The Structure of Science, p.121.

Here, the Instrumentalist can object that (b) does not express a statement. But to say so is to beg the question, since it is to establish the point that a sentence like (b) does not express a statement that the argument from statement-form was introduced. But the instrumentalist might claim that there is a meaning difference between the original sentence and the transformation and therefore our transformation using Ramsay's formula is illegitimate. However, the empiricist cannot raise such an objection since he defines meaning in terms of observational consequences and the observational consequences are the same in both the original sentence and the transformation. The above objection, therefore, proves counter-productive.

Another argument brought in favour of Instrumentalism is that most of theoretical statements are about ideal states and since ideal states do not exist in the actual world, the theoretical statements do not describe any real entities. However, we can always go on reducing the gap between ideal states and the actual states depending upon our need. Since there is nothing absolute in such a distinction it cannot be a basis for a philosophical argument. Secondly, the argument from the ideal states does not prove anything. It is interesting to note that this argument exemplifies the Platonic blunder in reverse. According to Plato, definitions

are about ideal entities or forms since the actual states do not always live up to the requirements of the rigorous definitions. It is on the same sort of distinction that Plato constructs a supersensuous ontology to accomodate the entities supposed to be described/referred to by definition/concepts and Instrumentalists deny theoretical statements/theoretical concepts descriptive/referential status. If the Instrumentalist reasoning is accepted, there is no reason why Platonic argument cannot be. Further, it is doubtful whether the question of ontological reference of a given sentence can be decided by whether or not the entities referred to by its terms actually exist. For example, the first law of motion involves the concept of inertial motion. We can never know whether the bodies with inertial motion exist. But, the question whether a statement describes reality has to be decided on whether its acceptance or rejection changes our conception of reality. Newton's law, once accepted, changed our conception of reality in the sense that 'rest' no more enjoyed naturalhood and ontological primacy over motion which it did in pre-Newtonian world. Hence, it is illegitimate or at least myopic to decide the status of statement like Newton's first law of motion on the basis of the ideal character of the entities referred to by its terms.

Conventionalism has as its adherents philosophers like Whewell, Bergson, Le Roy, Poincare, Duhem etc.. Conventionalists look upon scientific theories as pigeon-holes or systems of pigeon-holes purporting to organise facts into some coherent whole. Duhem, for instance, characterises a theory as "a system of mathematical propositions deduced from a small number of principles to represent as simply, as completely, and as exactly as possible a set of experimental laws."[1] The conventionalist view differs from Instrumentalism in the sense that whereas the former emphasises the systematising role of a scientific theory, the latter lays stress on its predictive function. Its difference with descriptivism consists in the denial of any unique relation between a given set of observation statements and a scientific theory. That is to say, whereas according to Descriptivism a scientific theory can be deduced, or can be shown to be deduced, from observation statements, conventionalism, on the other hand, holds that a scientific theory is a free creation and that any number of theories can be consistent with a given set of observations.

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1. The Aim and Structure of Physical Theory Tr. Wiener Oxford Univ. Press. 1954, p.19 Mary Hesse has attempted to read in Duhem certain essential realist elements - (cf. "Duhem, Quine and A New Empiricism" Knowledge and Necessity, Macmillan, 1970).
But Duhem's refusal to recognize any explanatory role for science and his insistence that "Explanation" should be left to metaphysics strongly speak against such an attempt at a realist rehabilitation of Duhem. As Lakatos points out, "Whewell and Duhem...differ less than most people imagine" (The Methodology of Scientific Research Programmes: Philosophical Papers: Vol.I Cambridge Univ. Press, 1978, p. 106).

In the conventionalist framework there cannot be a final refutation of a theory by any observation since any theory can be suitably adjusted to accomodate any fact however "recalcitrant".

We can distinguish two varieties of conventionalism, viz. (1) Naive conventionalism according to which scientific theories are pigeon-holes ordering facts which are theory-free. The construction of the pigeon-holes and the replacement of one pigeon-hole by another takes place on the ground-level of 'proven' facts; and (2) sophisticated conventionalism which does not recognisee any theory-free facts of observation and according to which the pigeon-holes order facts and are constructed on relatively theory-dependent observations or observation-statements. Duhem, a conventionalist of the latter variety, selects experimental laws or "theoretical facts", which are unlike brute or practical facts, as objects of systematisation by pigeon-holes. Since we have already argued against the possibility of pure observation, we shall not critically evaluate naive conventionalism. Instead, sophisticated conventionalism will be the focus of our attention in this section.

The conventionalist is aware of the fact that, given the free creation of scientific theory, in the absence of any meta-scientific criterion, the choice of a theory becomes so much a matter of mere decision or convention that his position looses even initial plausibility. He, therefore,

resorts to 'simplicity' as the primary meta-scientific criterion which decides the acceptability of one of two or more empirically equivalent theories. Hence, an examination of conventionalism becomes basically an examination of the idea of simplicity as a criterion guiding our choice among the competing courses in theory-constructions.

To begin with, there are different notions of simplicity. It can be syntactical or semantic or epistemological or pragmatic. The syntactical simplicity depends on the number and structure of (a) primitive concepts or basic extra-logical predicates, (b) the independent postulates, and (c) the rules of statement-transformation. The semantic simplicity which means economy of presuppositions depends on the number of meaning-specifiers of the basic predicates. Epistemological simplicity which means parsimony of transcendental terms depends upon experiential proximity. Pragmatic simplicity depends on factors like computational convenience, feasibility of experimental design etc. As Bunge points out, "No dependable measure of any of the four kinds of simplicity...is known at present."[1] Further, the various kinds of simplicity are not only incompatible with one another but also conflict with certain factors governing our construction and choice of scientific theories such as systematicity and tesability.

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1. "The Weight of Simplicity in the Construction and Assaying of Scientific Theories" <u>Philosophy of Science</u> vol.xxviii (1961) p.120.

Syntactical simplicity is sufficient but not necessary for systematicity which is necessary but not sufficient for testability since testability needs not only systematicity but also accuracy and scrutability of the basic predicates. But both accuracy and scrutability conflict with simplicity, both formal and semantic. The comparison between "inertial motion' and "natural state of rest" or "electrically charged" and "providential" bring out how simplicity conflicts with scrutability.("Natural state of rest" and "providential" are much simpler than "inertial motion" and "electrically charged"). More than any thing else, the idea of simplicity conflicts with the most significant characteristic of a scientific theory, viz. extendability which means the ability of a scientific theory to encompass more domains. For example, Hamilton's formulation of dynamics was preferred to Newton's because it could deal with wider class of dynamical problems and also because it can be extended beyond dynamics (into Field theory); yet, it is logically and epistemologically more complex in terms of equations and character of the concepts.

The above discussion mainly was about the logical difficulties that confront the view which takes "simplicity" to be the decisive characteristic of a scientific theory.

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1. Ibid, p.120.

Since "the paradigmatic case of a scientific revolution for the conventionalist has been the Copernican revolution"[1] and since "most historical accounts of the Copernican revolution are written from the conventionalist point of view,"[2] it is interesting to see the extent to which the idea of simplicity played its role during the processes of the revolution.

First of all, it is incorrect to say that the introduction of the additional epicycles made the Aristotelian system more complex than the Copernican system. For, the latter needed the radical overthrow of the world-view then prevalent. Is it not more simple to add some computational devices and even hypothetical entities in accounting for certain observations than to overthrow a whole world-view? It is too simplistic to consider a change in world-view to be less simple than stretching the world-view however far. Moreover, Copernican view also had to resort to techniques like "mean sun", circles moving on circles (similar to epicycles) etc. As Cohen points out, "A comparison of the two figures representing Ptolemaic and Copernican systems does not show that one was in any obvious

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1. Lakatos, Imre The Methodology of Scientific Research Programees: Philosophical Papers Vol. I Cambridge Univ. Press, 1978, p.107.

2. Ibid, p.107.

way simpler than the other."[1] Moreover, ~~just as~~ there is no neutral standard to decide what is simple. As Kuhn points out, "To Copernicans the behaviour of the planets was incompatible with the two-sphere universe; he felt that in adding more and more circles his predecessors had simply been patching the Ptolemaic system to force its conformity with observations; and he believed that the very necessity for such patching and stretching was clear evidence that a radically new approach was imperatively required. But Copernicus' predecessors...had evaluated the same situation quite differently. What to Copernicus was stretching and patching was to them a natural process of adaptation and extension."[2]

It can even be argued that the old view was simpler than the new one. In fact, it is because of the simplicity of the old world-view that even today the theory and practice of navigation and surveying start with the assumption of the two-sphere universe. As Kuhn points out, "Evaluated in terms of economy the two-sphere universe...remains what it has always been: an extremely successful theory."[3]

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1. The Birth of a New Physics, p.57.
2. The Copernican Revolution, p.75 Harvard Univ. Press 1957, p.75.
3. Ibid, p.37.

The above discussion shows how scientific progress was possible in spite of the least importance given to the idea of simplicity. In fact, one can say that it has been counter-productive. As we have seen, Newton refused to accept the wave theory of light, though it had its ground in his own experiments and those who formulated it owed to him much more than to themselves. It has also been pointed out that he did not want to stud with the basic entities of his conceptual scheme viz. atoms, radically different entities such as waves. In thus refusing to entertain more than one kind of entities he was perfectly following the virtue of simplicity. But that virtue, if followed by posterity, would have nipped in the bud the whole of epoch-making series of scientific researches of the 19th century into the nature of light.

Ordinarily, it is argued in support of the idea of simplicity that it ensures the reduction of possible mistakes. Thus, Ockham's razor cuts to size our propensity to maximise the population of ontological entities. Simplicity here works as a rational guide in minimising the pitfalls. However, this argument is not available to conventionalist for the reason that efficacy of the idea of simplicity depends on the assumption that the theoretical terms of a theory refer to objective entities or processes. But this

assumption cannot be fitted in the conventionalist's scheme since according to him scientific theories have no descriptive content independent of observation statements or experimental laws they cover. When, for instance, Einstein spoke of simplicity as one of the factors governing the choice or construction of a theory, his motive was in fact ontological. In the absence of such ontological intentions, one wonders what virtue simplicity has in itself other than aesthetic, that is, ornamental.

The above discussion shows how even sophisticated conventionalism, which does not presuppose the myth of pure observation, fails to stand close scrutiny since its central pillar, the notion of simplicity, is logically inadequate as well as historically questionable as a guiding principle in scientific theorising. We can round up our discussion of Conventionalism with showing one more major snag in the conventionalist view. Though it is true that the strongest version of conventionalism, viz. that of Duhem does not recognise a watertight distinction between theory and observation, a distinction is retained between scientific theories which are pigeon-holes and "theoretical facts" or experimental laws which are pigeon-holed. The idea of 'pigeon-holing' suggests that a scientific theory does not affect the character of the experimental

laws ("the theoretical facts") which it orders. On the contrary, in the history of science, we see that what the so-called "pigeon-holes" do to the experimental laws is something much more than ordering them. The examples of Jonnes, the Grammarian and Stevin who disproved Aristotle's experimental law of falling bodies could not effect its rejection since it was an integral part of the totality Aristotelian system. Thus, in this case, "the pigeon-hole" had not only placed the experimental law of falling bodies within an ordered hole, but effected its retention even in the face of the recalcitrant facts. What is more, many times, it is the scientific theory which confers law-hood on the so-called experimental law. This is clearly illustrated in the case of Boyle's law. Boyle's findings were looked upon as mere generalisation, or a stock of statistical correlations before it was subsumed under statistical mechanics and brought together with general gas theory and kinetic hypothesis all of which bestowed on Boyle's generalisation a role that the laws of nature are reputed to play. Therefore, a theory which affects the experimental laws so much and in so many ways cannot be a mere pigeon-hole for purposes of systematisation. In fact, the variety of roles that scientific theory plays in the life of the experimental laws singularly point to the fact that a theory is not merely an ordered

whole of experimental, low-level laws, but stands on an autonomous plane. In other words, the theoretical terms that figure in a broad scientific theory refer to a reality not described by experimental laws or observation statements.

Conclusion

Whatever be the differences in details and disparity of emphasis between the various views discussed in this chapter, their common characteristics, however, should not be lost sight of. That they are one in essence is evident from the fact that one and the same philosopher, like for example, Mach or Bohr occupy more than one of the above positions simultaneously.

All the three views in different forms and in varying degrees are lured by the deductive ideal. The neo-inductivism of Instrumentalism (of empiricist variety) realising the futility of the attempts of the classical Inductivists to raise the inductive method to the pedestal of deductive certainty refuse to concede to the scientific theories anything like objective credence since they cannot attain the deductive ideal. In the case of Descriptivism the obsession with the deductive ideal is too obvious to mention. That even conventionalism is not free from the deductive spell is evident from the fact that its chief exponents look upon

scientific theories as mere mathematical systems, spare no attempts to eliminate mechanical explanations and are averse to building mechanical models.

Apart from the common obsession with the deductive ideal, one finds in all the three, in varying degrees, a craving for a stable observational language. Even though the much desired observation language is not absolutely theory-free(like a pure phenomenalist language), all the three views take sufficient care to ensure that the observation language has the same interpretation as that of classical mechanics stripped of its undesirable ontological implications. Bohr clearly illustrates this when he says that "However far the phenomena transcend the scope of classical physical explanation, the account of all evidence must be expressed in classical terms."[1] It is interesting to recall in this context the initial abortive attempts of Copernicus to retain the observational language of the Aristotelian Physics- a language suited well with the idea of a stationary earth and yet trying to reconcile his heliocentric view with the geocentric view of Aristotle. It is instructive to note that the comparison enlightens us on the exact stage of the development that quantum mechanics had reached in the hands of its positivist interpreters.

1. "Discussions with Einstein on Epistemological Problems in Atomic Physics" Albert Einstein: Philosopher-Scientist, Vol.I ed: Paul Schlipp Harper and Row 1959, p.209.

More than anything else, all the three views in various forms lead themselves into what we have termed as "the crisis of integrity". According to Bohr any attempt at the replacement of classical concepts by new concepts of quantum mechanics is misconceived because there are "general limits of man's capacity to create concepts."[1] This defeatist and negative attitude goes hand in hand with surrendering the objective credence and explanatory role of scientific theories such that scientific theories become more of "expedients which enable us to express the essential aspects of the phenomena."[2] It does not take much effort to realise that the replacement of "truth" by "workability", "objectivity" by "expediency" is a clear admission of "a crisis of integrity". As de Santillana rightly observes, "when we are willing to suppose anything that will "work" when nothing is too far fetched to try, we have surrendered choice of thought and entered a phase which has some aspects of intellectual nihilism"[3] In the case of Instrumentalism the crisis of integrity expresses itself through this intellectual nihilism, whereas in the case of conventionalism the crisis

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1. Atomic Theory and Description of Nature, p.96.
2. Bohr, Ibid, p.12 (emphasis added)
3. "Galileo In the Present" Homage to Galileo ed. Morton Kaplan. The MIT Press, 1965, p.19.

finds its manifestation in the agnostic predicament of its chief exponents like Duhem who openly resort to neo-Kantianism. The positivist philosophy, of which Desciptivism is an un-adultrated variety could not help providing a leeway for every sort of false consciousness. As Passmore rightly points out, "a striking feature of recent philosophy, indeed has been the readiness of catholic philosophers to accept the positivist account of science on the ground that they 'leave room' for religion."[1]

The main source of this crisis of integrity lies in the mal-identification of the nature of scientific theories. The roots of this mal-identification are to be found in the attempts to abstract scientific theories from the realm of human activity in its historical context. It is only when theories are lifted from their historical context, that is, when theories are considered not as historically given solutions to certain problems and not as part and parcel of human activity that one is forced to treat theories as 'given' deductive systems and finished products. One wonders whether this alienation of scientific theories from the realm of human activity is itself a reflection of the general alienation of any product, material or spiritual, from the producer or the creator, the man - an alienation

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1. A Hundred Years of Philosophy, Penguin, 1968, p.328.

which is all too prevalent in a society whose products are the philosophical schools we are criticising. However, once the sense of history is lost, the cult of observation "disguises an essential problem. What is it that transforms an apparently temporary discrepancy into an inescapable conflict? How can a conceptual scheme that one generation admiringly describes as subtle, flexible and complex becomes for a later generation merely obscure, ambiguous and cumbersome?"[1] In order to save itself from the 'crisis of integrity' to get an authentic view of scientific theories, to disguise no fruitful question, a philosophy of science cannot afford to neglect the historical nature of science. When one finds even the ablest scientists could not help loosing the sense of history in philosophising about science, one strongly feels that natural science in itself contains the genesis of such a loss of historical sense. Marx observes "the weak points in the abstract materialism of natural science, a materialism that excludes history and its process, are at once evident from the abstract and ideological conceptions of its spokesmen whenever they venture beyond the bounds of their speciality."[2] It is, therefore, imperative for any adequate philosophy of science to look beyond science itself; in other words, it has to be more than, to use the words of Habermas, "a scientistic self-understanding of the sciences", that is, science's reflection on itself.[2]

CHAPTER 6

TOWARDS A REALIST THEORY OF SCIENTIFIC KNOWLEDGE

In this chapter, we shall outline our alternative theory of scientific knowledge. Here too in developing a realist view of scientific knowledge, we have drawn our material from the history of actual practice of science in different epochs. Although we believe, on the basis of the reasons given in the previous chapter that a satisfactory theory of science cannot but be realist in character, it should, nevertheless, stand away from some of the realist positions adopted recently. The most influential of such positions is the one taken by Karl Popper. Von Wright rightly characterizes the Popperian and other similar views as "the heir(s) to the neo-positivism of the Vienna Circle."[1] Their intrinsic disposition, according to Von Wright, is positivistic[2] and, therefore, "the somewhat patricidal anti-positivism of Popper and his followers must not be allowed to obscure the historic continuity...nor to blur the contrasts with other professedly anti-positivist currents of contemporary philosophy. Essentialy, the movement of thought sometimes called Critical rationalism is an upholder in our era of an intellectual tradition whose great classics are Comte and Mill."

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1. Explanation and Understanding, Cornell Univ. Press, 1971,p.9
2. Ibid, p.10.
3. Ibid, p.175.

Later, in the chapter we shall corroborate Von Wright's observation on the Popperian school. For the present it would suffice to bear in mind that in spite of its uncompromising opposition to inductivism or the empiricist cult of observation, and in spite of its sympathy with metaphysical thinking and its realist stance towards theoretical entities, the quasi-positivist character of the Popperian school can be traced to the dogma of methodologism which is shared by the formalist schools like Logical Positivism and other non-realist schools like instrumentalism and conventionalism. According to this dogma the aim of the philosophy of science is to give an adequate portrayal of the method of science, or "the logic of scientific discovery". That is, it should confine itself to the 'context of justification' as contrasted with the "context of discovery." Naturally, their discussions in philosophy of science are confined to questions regarding the structure or logic of explanation. Evidently, methodologism is based on the abstraction of form from content, of structure from substance. What is overlooked in this is the significant fact that the character of explanations is actually determined by our conceptions of reality which themselves are defined by what Harre calls general conceptual systems shared at different historical apochs.

A general conceptual system of a given epoch comprises of concepts expressing the basic assumptions regarding the existence, processes and structure of the world. The fundamental questions which different General Conceptual Systems seek to answer are are: (1) what is the world made of? (2) what is/are the fundamental process/es by which changes occur? and (3) what must the stuff of the world be like for the fundamental process (es) to occur in it?[1] The methods of investigation held to be proper and the kinds of explanation thought to be appropriate in any given epoch depend, as Harre points out, "in part, on the particular specification of general concept of matter popular in that epoch."[2] The search for a logic of all explanations blinds us to the important differences between, say, Aristotelian science which is by and large teleological and Galilean science which is mechanistic. Galilean science is born out of the destruction of Aristotelian-ptolemaic cosmos. Galilean science heralds the abolition of the conception of the world as a finite, closed system whose structure was determined by a hierarchy of values, and replaces it with the conception of an infinite universe which is united only by the set of non-hierarchical components

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1. Harre, R. Matter and Method, Macmillan, London, 1964, p.27
2. Ibid, p.6.

and mechanical laws, Unless the contrast between these modes of scientific theorising is appreciated one cannot understand the significance of the over-all intellectual spectrum that begins with Copernicus and ends with the Corpuscular theory. Further, as Harre says "at any given epoch there is an end to explanation and this end is reached when the entities and processes of an explanatory mechanism are those which form part of the denotation of...the general conceptual system of an epoch."[1]

6.1 Theory-dependent Character of Science

The significant point that emerges from our critical evaluation of the empiricist conception of the theory-observation relation is that observation is always theory-dependent. In Chapter 2, we have argued that pure observation in an absolute sense is impossible. In Chapter 5 the argument is extended to show its impossibility even in a relative sense. It is, therefore, not necessary here to reproduce arguments to establish what one might call the "omnipresence of theory." However, a few words about the way the general conceptual system determines observation-language are in order. The facts or observations in science are expressed in terms of concepts which in their use are employed in a refined form. Thus, for example, in dealing with the

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1. Ibid, p.6.

dynamical phenomena, the raw concept of speed is replaced by the precise concept of velocity which is measured in terms of unit distance and time. The so-called language of direct observation undergoes refinement or reduction to suit scientific purposes. The character of this refinement is determined not just by necessities of measurement but "by an ideal of conceptual unity."[1] The unity is achieved by the language ~~by the language~~ that science uses at a particular stage. The same point is made by Koyre in a slightly different way when he says that, "Experimentation is the methodological interrogation of nature, an interrogation which presupposes and implies a language in which to formulate the questions and a dictionary which enables us to read and to interpret the answers."[2]

6.2 The Nature of the Theoretical Framework

The concepts in terms of which observations are described are not, therefore, isolated from each other. They are interconnected either by definitions or by what Harre calls "reticular theories" which express the relationships between refined observational concepts, "mediated by one or more theoretical concepts which are to be understood wholly in terms of a complex of refined observational concepts."[3] Thus, the reticular theories are phenomenological.

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1. Ibid, p.12.
2. Metaphysics and Measurement, Chapman and Hall, 1968, pp.18-19.
3. Harre, R. op. cit. p.13.

The corpus of science is full of reticular theories which though do not explain phenomena, play a crucial role by connecting refined observational and theoretical concepts, and thus lending the totality of concepts the character of a network or web. The network of observational concepts which are connected by reticular theories is continuous with the network of the theoretical concepts. Not only does the total network give the concepts their normal background such that every concept is functionally dependent upon the totality of the conceptual network of a science at a given stage of its development, it also lends some notions of a 'self-evident' character. The case of 'inertial motion' is a handy example. It appears for us today 'self-evident', 'clear' and even 'simple' whereas it was never conceived so before the seventeenth century at least since Aristotle. It is only to those who share the theoretical network which the science of mechanics developed since the seventeenth century that the notions like "inertial motion" are 'simple' or 'self-evident' or even 'clear! This also explains, as Koyre points out, "why the discovery of such simple and easy things, for instance, the fundamental laws of motion, which today are taught to, and understood by children, has needed such a tremendous effort...by some of the deepest and mightiest minds ever produced by mankind: they had not

to "discover" or "establish" these simple and evident laws, but to work out and to build up the framework which made these discoveries possible."[1] The general conceptual scheme decides the character of theoretical concepts which mediate the observational concepts, just as it determines the nature of observational concepts themselves.

6.3 Scientific Knowledge as Relation-oriented

To reiterate, observations depend upon the concepts that are used in refinement and these concepts are related by phenomenological or reticular theories. We can define additional theoretical concepts in terms of the original concepts of the reticular theories we possess. For instance, if F = ma and if every relation between dynamical observables is mediated by equality of forces then every additional dynamical concept can be shown to be functionally related to F or ma. The relations established between observation concepts might be those of identity or function. It is necessary here to indicate the significant role of space and time in the whole body of science. Not only do they bring observables into some relations through reticular theories, they are themselves relations, even in their absolutist sense. Secondly, they exemplify the way in which the fundamental entities necessarily determine the character

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1. op. cit. p.3.

of the concepts that occur in reticular theories. The absolutist conception of space and time is a necessary consequence of the atomistic world-view. This is clearly evidenced by the ancient (Democritean) physics[1] and Newtonian physics both of which are atomistic. By contrast, in the non-atomistic physics of Aristotle and in the twentieth century physics "the concept of the material object (or atom) is gradually replaced as the fundamental concept of physics by that of field."[2] Consequently, the absolutist conceptions of space and time give way to the relativistic conceptions. Thus Einstein says that the idea of excluding the existence of empty space, that is, the idea of relativistic space, "appears absurd as long as physical reality is seen exclusively in ponderable bodies.[3]

The explanatory theories, in contrast to the reticular theories, are used not to form relations among observables, but to explain these relations. According to Harre, they contain, "at least as many relations among the theoretical concepts as they explain between observables together with sufficient relations between descriptive and theoretical concepts to enable a theoretical relation to be constructed for every member of the set of observable relations expressed in terms of descriptive concepts."[4] The most important relation

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1. Einstein, A. Foreward to Max Jammer's Concepts of Space, p.xiv.
2. Ibid, p.xvi.
3. Relativity: The Special And General Theory, Methuen, 1960, p.154.
4. Harre, R. op.cit. p.18.

thus established by the explanatory theories is the causal one. Causality in this respect is an integral part of the structure of science. To philosophers like Russell and Toulmin who hold that 'causality' hardly appears in the works of science,[1] one can only point to Newton's rules which guided his historical work in natural philosophy. He says, "we are no admit to more causes than such as are both true and sufficient to explain their appearances."[2] And again, "to the same effects we must, as far as possible assign the same causes."[3] However, it is necessary to keep in mind the precise, distinct and unique character of causality or the category of causal relations so as to distinguish it from the more general concept of "lawfulness".

In the history of the philosophical treatment of causality one can discern two diametrically opposite views concerning the relation between 'causality' and lawfulness. One of them upheld by materialists like Lucretius and modern thinkers such as Jean Bernoulli reduces 'lawfulness' to 'causality'. According to it all lawful relations basically emanate from causal relation. Though this view is no longer popular, it has some merit. The ancient materialists

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1. cf. Russell, B. Mysticism and Logic, Allen and Unwin, 1963, p.132 and Toulmin S. The Philosophy of Science, Hutchinson, London, 1953, pp.9-10.
2. Mathematical Principles of Natural Philosophy, ed. Cajori, Florian, Cambridge Univ. Press, 1934, p.398 (emphasis added)
3. Ibid, p.400. (emphasis added)

were far more advanced in their conception of matter than Aristotle. Matter, for them, was endowed with activity whereas for Aristotle the most fundamental processes by which changes occur in nature were nothing but replacement of one 'form' by another and 'form' was conceived to be independent of matter. For modern science the basic ontological guideline came not from Aristotle but from the ancient materialists as is clear from the writings of Bacon.

In contrast, the second view which is most commonly found in the history of philosophy of science and upheld by thinkers like Berkeley, Hume, Taine, Hannequin, Ostwald, Russell and others is the empiricist conception which reduces 'causality' to 'lawfulness'. It is not necessary here to go into an examination of the empiricist conception of causality since a great deal has been said against it in the literature.[1] It is sufficient to note that though both the views mentioned above are diametrical opposites of each other, they share a common assumption, viz. 'causality' and 'lawfulness' are basically identical.

A few words regarding the logical features of the category of Causality or the causal relation are in order. A Scientific law, causal or not, "does not express what happens but what would happen if certain conditions were met."[2]

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1. cf. Meryerson, Emile, Identity and Reality, Chapter 1, and Bunge, Mario Causality: The Place of the Causal Principle in Modern Science 3 (Part II)
2. Meyerson, Emile, Identity and Reality, p.19.

Therefore, a statement expressing a causal relation must be conditional in nature. That is to say, within the gamut of causal law, the emphasis is on the relation rather than on the relata. It is true that this feature of the causal relation is in itself insufficient as a differentium in distinguishing causality from other forms of lawfulness. But it is by properly characterising the relation of conditionality that we can form an adequate idea of the causal category. Its constancy and asymmetricity are its two general features. It characterises a constant relation in the sense that the cause follows the effect invariably. It is asymmetrical in two related senses. One, that the effect will occur only if the conditions referred to by cause are fulfilled. In other words, the cause is ontologically or existentially prior, though not necessarily so in the temporal sense and two, as Von Wright has shown, the relation that holds between two events of which one is the necessary condition of the other, does not hold in the case of a causal relation.[1] In a causal relation there is a one-to-one correspondence between cause and effect.

The above characteristics though important in delineating the category of causal relation from functional dependence and statistical regularity are insufficient in providing its

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1. cf. Explanations and Understanding, Cornell Univ. Press 1971, pp.41-44.

2. Causality, p.45.

differentium or unique characteristic. A causal relation uniquely manifests a productive or active relation. Only a dogmatic commitment to the tenets of empiricism can permit one to wish away this brute fact. The empiricist identification of causation with regularity, is, as Bunge points out, "grounded in the original sin of empiricism, namely, the identification of <u>truth</u> with <u>criterion</u>, the reduction of meaning of a proposition to the mode of its verification."[1]

Just as the character or status of space and time depend upon the nature of fundamental entities defined by the general conceptual system, causality too is so determined. We have in the atomistic conception of reality, the mechanical mode of causal relations; whereas, in a non-atomistic conception of reality as in the case of Aristotle, causal relations acquire a teleological shell. In twentieth century physics, wherein mechanistic materialism has been shown to be inadequate, the 'mechanistic' causal relations are supplemented by interactions, though not replaced by them.~~[2]~~

The concept of causality has a unique significance for a realist philosophy of science. The causal concept is organically related to, on the one hand, the concept of substance and on the other, the concept of force, ~~to identify~~

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1. <u>Causality</u>, p.45.

~~2. Jammer, Max, Concepts of Force, p.45.~~

~~"cause" and "force" as some philosophers especially Kantians did~~. The anti-realist schools which purport to eliminate from the "picture" of science,all theoretical entities make causal category the chief butt of their attack. The concept of substance which is the central notion in the scheme of realist philosophy "derives from the empirical application of the principle of causality. The notion of substance... is used, in its turn, to deduce from it the particular causal connections. Causality, thus attached to substance, is called "force" and the substance to which the actions of this force are referred is regarded as the "carrier of the force."[1] It is in the light of the role of causal concept as a mediator between force and substance, that its significance to realism is to be appreciated.

6.4 Realism and Scientific Knowledge

In the third Chapter we have seen how the principle of causality is necessarily linked with the principle of identity which implies the perdurability of objects in time. This is further supported by the fact that what motivated Einstin's attempt to pass from a statistical description to a causal one was basically his dissatisfaction with the limited character of quantum theory as it then existed.

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1. Jammer, Max, Concepts of Force, p.15.

He writes, "I cannot seriously believe it (Quantum theory) because the theory is inconsistent with the principle that physics has to represent a reality in space and time, without phantom actions over distances."[1]

In fact, the principle of identity or perdurability through time is central to any relation, causal or otherwise. The processes, properties or quantities in science presuppose invariants. As Harre observes, "no predictions would be possible unless there were some invariant which 'carried through' from the initial conditions to the predicted outcome of a process. Prediction depends upon having a rule which usually works, and to have a rule a necessary condition is that it be applied successfully more than once."[2] The subsequent application of the rule in turn demands invariance of process or substance or property. This means that there must be two kinds of invariance, one which persists through each process considered separately, and, the second, which persists through repetition, without which application of rules would make no sense. Harre says: "we must say 'must' here not because there is some universal necessity which forces these invariances upon us, but because the nature of our science is determined by our choice of invariables."[3] That is to say that although

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1. Quoted in Born, Max Natural Philosophy of Cause and Chance, Oxford Univ. Press, 1949, p.123.
2. Harre, R. op. cit. p.33.
3. Ibid, p.33.

the different conceptual structures differ without regard to particular choice of invariants, what is common to all conceptual system is the possession of some invariants. Therefore, the belief in an objective reality of some perdurables and invariants is indispensible for the possibility of science. This belief, thus, has the character of the synthetic apriori.

The seminal importance of realism becomes evident if one looks at the epoch-making periods and crucial stages in the history of science. A close scrutiny into them reveals that at these moments science has been guided by the realist or materialist conviction that it is not the conditions of knowledge that determine the conditions of Being but it is the conditions of Being that determines the conditions of knowledge. Writing about the degenerate character of medieval science, Einstein says that it "represented a deterioration of the much earlier conception of the Greeks...the naive picture (of the middle age cosmology) cannot be blamed on the Greek astronomers. Hellinic ideas had been objective and free from animistic views - a merit which can be only conditionally conceded to Aristotelian cosmology."[1] This

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1. Foreward to Galileo's <u>Dialogue Concerning Two Chief World Systems</u> ed. Drake, Stillman, p.ix, xi.

pregnant observation though modestly expressed brings to our mind the revolutionary and progressive character of early Greek science which stands in contrast to the relatively regressive character of Aristotelian science and totally stagnant science of the middle ages. In its boldness of thought and high rational standards the pre-socratic intellectual tradition compares only with the revolutionary science of the post-Renaissance period. It is noteworthy that in both these creative periods it was materialism that guided the life of science. In Aristotelian science the conditions of knowledge determine the conditions of being.* Not surprising, therefore, that his physics dealt with perceptible bodies per definitionem and only perceptible qualities were admissible among the constituents of elements.[1] If some objectivity is conditionally conceded to Aristotle, it is because of the semi-materialist character of his system. On the other hand, as Koyre points out, "In the Newtonian world and in Newtonian science...the conditions

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* Of course, Aristotle's views regarding Knowing-Being relation underwent a radical change when he completed his 'progressive withdrawal from Plato's influence' by repudiating Plato's separation of Ideas and objects of material world. But by the time he came out of Plato influence, he had completed his works in the physical sciences. As Farrington points out, the "new conception of the relation between Being and Knowing provided the basis for the biological work which occupied the the last years of his life." (Greek Science: Its Meaning for Us, Penguin, 1969, p.127.)

1. cf. F.Solmsen, Aristotle's System of the Physical World, Cornell Univ. Press, 1960, Chapter 17.

of knowledge <u>do not</u> determine the conditions of being; quite the contrary, it is the structure of reality that determines which of our faculties can possibly (or cannot) make it accessible to us. Or, to use an old, Platonic formula: in the Newtonian world, and in Newtonian science, it is not man but God who is the measure of things."[1]

It is not unusual to find some writers raising questions about the reconciliability of the ontology of science with that of ordinary perceptual objects. Some philosophers like Maxwell who are realists in so far as the theoretical entities of science are concerned, deny the ontology of the object of ordinary perceptual knowledge. To one who looks at the development of scientific knowledge in the light of specific problems of science itself and a context of those problems provided by the ontology of ordinary perceptions, the problem of reconciliation of the two ontologies itself appears illegitimate and an attempt to solve it uncalled for. However, the attempt to resolve the issue of 'reconcilation' in favour of the theoretical entities is much more unwarranted. Since the explanatory theories are meant to account for the laws which express observational regularities and since these regularities are from the

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1. "Influence of Philosophical Trends on the Formulation of Scientific Theories" <u>The Validation of Scientific Theories</u> ed. Frank, Philip. Coller Publishing Co. 1961, p.183.

macroscopic or ordinary perceptual world, the entities of explanatory theories stand at a level different from those of ordinary objects. When philosophers like Maxwell claim that scientific theories have established the falsity of ordinary perceptual claims, they assume that both ordinary perceptual statements and scientific theories stand at a same level. Even, those who think that scientific statements are translations of ordinary perceptual statements in a technical language make the same assumption. The absurdity resulting from such a level-amalgamation is brought to light when one looks at the words of Lionel Trilling who shows how ridiculous it is to translate "they fell in love and married," into "their libidinal impulses being reciprocal, they activated their individual erotic drives and integrated them within the same frame of reference."[1] While maintaining a realism of theoretical entities, one should bear in mind the ontological compatibility of the theoretical entities with the entities of ordinary commonsensical perception.

6.5 Social Determination of Scientific Knowledge

It may be argued that in maintaining the priority of theory over observations we are forced to embrace the occult of the apriori, characteristic of rationalism. True, critical

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1. The Liberal Imagination, Secker and Wasburg, 1955, p.285.

rationalists like Popper maintain the autonomy of the critical theoretical activity of science along with the priority of theory of observation and in doing so they lend the theoretical framework of science an aura of apriori. In opposition to such a position we maintain that the theoretical activity of science is rooted in the social-practical life of man. Scientific knowledge is existentially or socially determined. The socially determined character of scientific knowledge can be comprehended if sciences as practised at a given place and time are viewed in the background of the concrete social life or the general ideological climate in that place during that period.

To any one who looks at the history of science, it presents a discontinuous development marked by not only advances and successes, but also by failures and setbacks. A philosophy of science which lays exclusive emphasis either on the critical theoretical activity of science or its observational basis, overlooks these chequered annals in the history of science. It fails to explain why certain epoch-making events occured in precisely those times in which they occurred. More than anything else, it fails to explain the fact that the character of scientific activity or even the character of science is different at different times and different places. It is only by recognizing the social dimension of science that one can do justice to these important aspects of the phenomenon of science.

We have seen in Chapter 4 how science originated in the "It-conception" of Nature which had replaced the "Thou-conception" of Nature. The change in Man's attitude towards nature must be due to a radical change in the character of man's struggle with nature. That is to say, a basic transformation in the material conditions of human society. In the concluding chapter we will consider this aspect in greater detail. Presently we will briefly indicate some of the important stages in the development of science so as to expose its socially determined character.

The generalized thinking or naturalist speculation in science is the most important and unique contribution of the Ionian philosophers or scientists. In contrast, the earlier civilizations of Egypt and Babylonia could not make a similar contribution even though they had men with as much natural curiosity as the Ionians and had to their credit a mature theoretical development in at least some of the sciences. The question, therefore, is, why did the Greeks succeed where others failed? The answer is to be found in the character of the social life of these civilizations. Both, the Greek civilization on the one hand and Egyptian and Babylonian civilizations on the other, passed from the Bronze-age to the iron-age almost simultaneously. But the framework into which the changes brought about by the new mode of production were fitted, were different in the two cases. Childe points

out that "In the orient...the Iron Age inherited the monorchical traditions of the Bronze age. Assyria, Babylonia and Egypt were just continuation of Bronze age states and preserved divine kingship with minor modifications as they preserved so much of old economy."[1] This means that by the time science emerged in those civilizations, the Egyptian and Babylonian societies had acquired a theocratic character and centralised powers. To maintain the social cohesiveness superstitions were systematically inculcated. The priestly class provided the ideology for such superstitious and centralised societies. According to Farrington, "the organised knowledge of Egypt and Babylon had a tradition handed down from generation to generation by priestly colleges."[2] Hence, "the world-view of the Egyptians and Babylonians was conditioned by the teaching of sacred books; it thus constituted an orthodoxy,"[3] an orthodoxy sufficiently strong to nip any buds of scientific cosmology, whereas, as Childe notes, in mediterranean Europe "theocratic monarchy on the oriental pattern had never become firmly entrenched... (it had) withered or was reduced to a purely ritual office in most Greek states."[4] The governmental function of the Greek

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1. What Happened in History, Penguin, p.213.
2. Science in Antiquity, Oxford Univ. Press, 1947, pp.36-37.
3. Ibid, p.37.
4. Op. cit. p.213.

society were carried on by a diffused landed gentry or aristocracy. With the breakthrough brought in by the Iron age the newly emergent merchant class challenged the authority of the landed gentry and wrested from it concessions for itself. These concessions transformed the old society into what Greeks called Democracy, the rule by the people. In the absence of a centralised power demanding absolute loyalty there was no need to inculcate superstitions. Such a free atmosphere unhindered by the shackles of tradition was intellectually necessary for bold speculations. The Ionian philosophers were the products of such a social environment. To quote Farrington again: "Their freedom from dependence on mythological explanations was due to the fact that comparatively simple political structure of rising towns did not impose upon the ruling classes the necessity of governing by superstitions, as in the old empires."[1] Further, the intellectual elite in its efforts to provide an ideological superstructure to the new society and maintain its cohesiveness required abstract ideas and generalized thinking. The new consciousness of secularism and humanism which is reflected not only in Homer's Illiad but also in the works of later poets like Archilochus, Sapho and Alcaus uprooted the vestiges of the ideology of the degenerate theocracy. More than anything else, the interest of the ruling class in the techniques, its

1. Greek Science: Its Meaning for US, Penguin, p.36.

dire involvement with technological production and absence of large scale slavery helped the intellectual elite of the time to combine manual and mental labour. It was because of this that Ionian philosophers explanations of Nature did not resort to any power outside nature.

But in spite of its bold theorizing, free intellectual adventures and grand speculations, the early Greek science, as we know, died ultimately because of its inherent weaknesses. The fundamental weakness was its separation of theory from practice which itself was the result of the rise of slavery as an institution. This explains the Greek failure to develop the physical sciences and especially chemistry. This in its turn accounts for the Greek failure in the realm of another field, namely, medicine. Through the relentless effort of Hippocratus and Hippocrateans the Greek science of medicine had an exceptionally balanced development. But medicine has always remained least autonomous and self-dependent of the sciences. As Crowther rightly says, "many parts of it are still scientifically crude, and those parts which have become scientific owe their character more, on the whole, to advances in biology, chemistry and physics, inspired by other techniques."[1] It is because medicine needs these sciences and because these sciences themselves need "socially disreputable" techniques,

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1. Crowther, J.G. The Social Relation of Science, The Macmillan and Co.1941, p.61.

that the Greek science of medicine reached its old age before a full blown youth. Later, the science of medicine did not even retain what was lent to it by Hippocratus, viz. the combination of theory and observation. It lost its own wealth, because it did not get what was needed and what was expected from other sciences. The father of modern anatomy, Vesalius rightly ascribes the decline of Greek science to the Greco Roman contempt for manual work. He describes in detail how all the substantial and practical aspect of scientific work in medicine was left to slaves by the so-called medical scientists. The doctor stood over his patient like an architect over a building. The verbal character which science of medicine acquired through a complete separation of theory and practice becomes shockingly clear by the fact that the successors of the great Galen taught anatomy for twelve hundred years without any one of them discovering that the dissections he described were not of humans but of monkeys.

The gap between theory and practice that came into existence in the Ionian science was further widended by Pythagoreans with their bias for mathematics. The final shape to this gap was given by Plato who literally replaced physics by mathematics. In providing intellectual legitimation to slavery and with it to the social prejudice against manual work and in declaring the scientific pursuit of truth to be

a search for shadows, Platonism is a deceptively subtle relapse into an intellectual and political theocracy. Its strong spell fell on Aristotle at the most formative years of his intellectual career. Aristotle wrote his work on physics, astronomy and mechanics while he was still under Plato's spell, whereas his works relating to the biological science were written after he came out of Plato's maze. One finds in these works an extraordinarily high level of scientific research. However, in spite of his most painstaking labour in biological science, he was not able to evolve a broad theoretical framework. The Greek failure in this context if seen through Popperian glasses would appear to be the result of the dimunition of critical faculties of the individuals in Greek society. Farrington seems to be right when he says that "the endeavour to explain great social movements by the psychology of individuals is one of the crippling errors of our times..(For) while science as a whole became a prey to creeping paralysis there was no lack of individual talent, no lack of individual genius...The failure was a social one, and the remedy lay in public policies that were beyond the grasp of the age."[1]

It is only in modern science i.e. the Renaissance and post-Renaissance science that one finds that the gap between

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1. Greek Science: Its Meaning for Us. Penguin, 1969, pp.302-38.

theory and practice is completely filled. Of course, this has been made possible only because the new ruling class found in sciences the promoter of its interests. Whatever suited the interests of the new class lost its traditional stigma. The study of metals for example, became respectable because such a study was necessary from the point of view of the interests of the new ruling class. Though the craftsmen of antiquity worked with metals, they could not make them the objects of scientific study. As the bourgeoisie became the ruling class its interests naturally became dominant. In contrast, the craftsmen of antiquity never became the ruling class and therefore could not harness the intellectual activities of the society in the direction of their interests. Nothing seems to be more appropriate description of the rise of modern science than these words of Crowther: "the explanation of how an extremely pious noble man such as Boyle could, in the seventeenth century, earnestly investigate queries, mechanical tools and processes, which to a nobleman of the twelfth century would have seemed blasphemous and socially degrading,also explains the rise of modern science."[1]

It may be argued that the social factors are only external so far as the structure of science is concerned and

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1. The Social Relations of Science, p.239.

therefore not relevant to a philosophical theory of science. But in our opinion, the social factors determine the structure of science also. This can be best illustrated if we look at various conception of law operative at the different places and different times. Joseph Needham draws our attention to the basic difference between the conceptions of law in Chinese science and in western science. He says, "In western civilization the idea of natural law in the juristic sense, and of the laws of nature in the sense of the natural sciences can easily be shown to go back to a common root. Without doubt one of the oldest notions of western civilization was that just as earthly imperial law-givers enacted codes of positive law to be obeyed by men, so also the celestial and supreme rational Creator Deity had laid down a series of laws which must be obeyed by minerals, crystals, planets, animals and the stars in their courses."[1] The Chinese conception of natural law, however, did not have the theological colour. This is because, "the available ideas of Supreme Being, though certainly present from the earliest times, became depersonalised so soon and so severely lacked creativity that they prevented the development of the conceptions of law ordained from the beginning by a celestial law-giver for non-human nature."[2] By the time political centralisation and ethics based on theological conceptions came into existence Chinese science was already dead.

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1. "Poverty and Triumphs of the Chinese Scientific Tradition." Scientific Change, ed: Crombie A.C. Heinemann, 1963, p.135.

2. Needham, J. Ibid, p.136.

What is equally interesting to note is that historically the idea of natural law as a supreme legislation for the behaviour of natural objects makes its appearance on those occasions when societies are infested with political centralizations. Thus, for example, it first made its appearance in the politically centralised ancient world of Babylonia at the time of Babylonian creation of the myth of Murduk and the Hammurabi legal code in 2000 B.C. The Greek scientists did not entertain such an idea and in their times the Greek society had no centralised political structure. But the stoics introduced this idea in 200 B.C, the time of political centralisation in the Hellenistic monarchies. The idea fell into oblivion in the medieval politically decentralized feudalism. It was revived with the emergence of centralized national-states in the seventeenth century, Descartes speaks of the natural laws as if they were put into nature by God. As science unleashed the powers of Nature through the Industrial Revolution, the concept of law came to be stripped of its theological garb to attain a revival brought in by what one might call 'the great naturalist celebration," reflected in the nomenclature of the philosophies championed of thinkers like Schlling, in political thought of Rousseau with his call to "go back to Nature," and more than anything else in Romantic poetry.

6.6 The Grounds of Objectivity of Scientific Knowledge

It was pointed out in Chapter 3 that the theoretical framework in and through which perceptual knowledge is acquired is public in the sense that it is intersubjectively shared. In deciding what is normal and what is not, without which the application of concepts is impossible, intersubjectivity of the theoretical framework is presupposed. Wittgenstein's introduction of the idea of forms of life in this context is undoubtedly the most illuminating way of uncovering the nature of language and thus, of our ordinary perceptual knowledge.

Anologously, public agreement or intersubjective sharing of the theoretical framework is, logically speaking, axiomatic in scientific theorising. As Polanyi says, "the first step towards establishing thepremises of a mental achievement like science is,....to acknowledge its authentic instances."[1] The public character of the theoretical framework of science is made evident as Ziman points out by "the cliche of scientific prose...itself; 'Hence we arrive at the conclusion that....' "[2]

Similarly we have seen in Chapter 4 how in the case of perception, what is objective and what is not, is decided

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1. Personal Knowledge, the Univ. of Chicago Press, 1958, p.163.
2. Public Knowledge, Cambridge Univ. Press, 1968, p.9.

by our theoretical framework. That is to say, the question of objectivity has to be raised within the theoretical framework since, to be objective is to be objective as such and such. Similarly, what is scientific and what is unscientific or what is scientifically objective and what is not, has to be decided within the intersubjectively shared theoretical framework of current science. To quote Polanyi again, "any one who speaks of science in the current sense and with the usual approval, accepts this organized consensus as determining what is scientific and what is unscientific."[1] The search for absolute objectivity in science will lead to a futile search for pure observations just as the search for absolute objectivity in perception leads to a futile search for pure experience. Of course, one might still question, whether there are any proven criteria to decide in terms of rationality or objectivity between one scientific theory over other. One can even broaden the challenge and ask whether the theoretical framework of science as such is superior to, say, a myth. The latter challenge is usually characterised as 'Cognitive relativism' of which, the former one, 'scientific relativism' is a specific version. We consider the challenge of cognitive relativism in the "conclusion" since its epistemological ramifications are of a very general character.

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1. Op. cit. pp.163-164.

6.7 Theory-observation Relation

In Chapter 4 we made use of Bruner's learning model in representing schematically the relation between experience and perceptual knowledge. Similarly, a structurally identical model can be used to schematically represent the relation between "facts" and theory) or observational statements and theoretical statements . Such a model has been provided by Mary Hesse.[1] Her learning model, like Bruner's, is an input-output mechanism. The input-output mechanism with its code system or soft-ware corresponds to what Kuhn characterises as "paradigm" and what Harre calls "general conceptual system". The information or input provided to the machine is represented in the machine language. Thus, the input is filtered according to the requirements of the structure of the machine and formulated in term of its coding system or soft-ware. In other words, "The process of describing experience in intersubjective language by the scientific community is representable as the coding of the input into machine language."[2] The product, then, is the coded input which may not be a complete or accurate representation of the input. The output comes in the form of generalisations or low level laws and also, high level theories.

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1. "Duhem, Quine and a New Empiricism" Knowledge and Necessity Royal Institute of Philosophy Lectures. V1.3, 1968-69 Macmillan, 1970, pp.198-199.

2. Hesse, Mary, "In Defence of Objectivity" Proceedings of the British Academy, Vol.LVIII (1972) Oxford Univ. Press p.289.

The learning model has feed-back loops such that the machine "allows for the circular self-correction of theory by experience and experience by theory that is demanded by the interpretation of science as theory-laden."[1]

The self-correction or self-adaptation for which is made in the model is central to scientific activity. As Kuhn points out, "much of the research undertaken within a scientific tradition is an attempt to adjust existing theory or existing observation in order to bring the two into closer and closer agreement."[2] It is important to note that the observations are not pure observations but theory-laden and facts are "theoretical facts" and hence observation-statements are not 'protocol' statements. The admissibility as well as modification of "observation" or "facts" is determined by the criteria provided by the paradigm and these criteria are apriori, relative to the input. It is this determination which makes "the network of relatively observational statements (or concepts) ...continuous with a network of theoretical relationships."[3]

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1. Ibid, p.283.
2. "The Essential Tension: Tradition and Innovation in Scientific Scientific Creativity: Its Recognition and Development ed: Taylor and Barron, John Wiley and Sons, 1963, p.348.
3. Hesse, Mary "Duhem, Quine and a New Empiricism" Knowledge and Necessity, p.207.

The mode of development characterized by an adaptivity between theory and observation under the umbrella of a paradigm belongs to the realm of what Kuhn calls "normal science". The dynamics of scientific knowledge is not exhausted by the normal course of scientific development. The metamorphosis of scientific knowledge is also characterised by radical changes brought in by revolutions. The revolutions, as Schumpeter writes in some other context come "in order to write the conclusion under a complete set of premises."[1] In other words, revolutions do not occur unless certain conditions are satisfied. Two sorts of conditions can be discerned in the history of every scientific revolution. They can be characterized as objective and subjective. The objective condition denotes the crisis of the paradigm resulting from the failure of smooth adaptivity necessary for the growth of normal science. The subjective condition denotes the availability of a set of competing paradigms. "As in political revolutions," Kuhn points out "so in paradigm choice - there is no standard higher than the assent of the relevant community."[2] The assent of the scientific community is guided not by the considerations of the fidility of the new paradigm to observations, but on its ability to resolve the crisis and illuminate the path for the future just as the choice of a political ideology at the revolutionary times is made not

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1. Capitalism, Socialism and Democracy, Unwin 1973, p.58.
2. The Structure of Scientific Revolutions. The Univ. of Chicago Press, 1972, p.94.

on the basis of the conformity of given ideology to "basic nature of Man" but on its ability to give new direction to social life and activity at a given stage of historical development. In other words, the success of a paradigm consists in its providing a new sense of direction at a given historical stage of the development of science. The available observations at the time of the choice of a paradigm belong to the realm of the old paradigm which is crisis-ridden. Hence, instead of supporting the new paradigm, those observations, because of their backward character, block its acceptance and development. In fact, they need to be emancipated from their backward state. In thus emancipating them the new paradigm changes their character. In the process, the new paradigm creates a new observational language. In turn, the observational language thus emancipated, sustains the paradigm by providing it an empirical basis, in however loose a sense. The relation between the realm of observation and the realm of theory at the time of radical shifts of paradigms, therefore, can be characterised as dialectical.

Common to the idea of adaptivity which characterises the growth of normal science and the idea of dialectical movement which marks the growth of science in revolutionary periods is the idea of non-linear interdependence. That is to say, the growth of scientific knowledge in both its normal

and extraordinary aspects, displays a non-linear inter-dependence between theory and observation. Needless to say, this view of theory-observation relation and growth of science stands in contradistinction to the positivist or empiricist claims of absolute freedom of observation from theory and cumulative growth of theories on the bedrock of a stable observation language. It also stands diametrically opposite to Popper's advocation of relatively theory-free character of observations and linear inter-dependence of observation and theory as elucidated by his "Hen-and-Egg' theory.[1] What is worth noting is that even eminent positivists did accept the impossibility of absolutely theory-free observation. Comte clearly points out, "If on the one hand, every positive theory has to be based on observations, it is, on the other hand, also true that our mind needs a theory in order to make observations. If in contemplating the phenomena we did not link them immediately with some principles, it would not only be impossible to combine isolated observations and draw any useful conclusions, we would not even be able to remember them, and for themost part, the facts would not be noticed by our eyes."[2] Just as Popper is led to the idea of in born expectations in his search for the starting point of knowledge,[3] Comte resorted to theological conceptions as

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1. cf. Conjectures and Refutations. Routledge and Kegan Paul, 1972, p.47.
2. Quoted by Frank, Philipp. 'Einstein, Mach and Logical Positivism' Albert Einstein: Philosopher-Scientist, VoLI ed: Schilpp, P.A. Harper and Brothers, 1959, pp.277-8.
3. Op. cit. p.47.

the candidates for that role. This is lucidly brought out in the words of Comte himself when he says that "squeezed between the necessity of observing in order to form real theories, and the no less urgent necessity of producing some theories to make coherent observations, the human mind had not been able to break this circle if not natural way out had been opened by the spontaneous growth of theological conceptions."[1]

Whatever be the similarities between Comte and Popper, the one worth-noting point that emerges from the above considerations is that a genuine anti-positivist view regarding observation-theory relation should go beyond the conception of linear interdependence.

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1. Quoted by Frank, Philipp op. cit. p.278.

CHAPTER 7

CONCLUSION

From our discussion of perceptual and scientific knowledge, we can arrive at the following general conclusions:

1. That, knowledge is theory-laden through and through.
2. That, the so-called "non-given" entities supposedly figuring in the "superstructure" of knowledge have a primary and substantive reality.
3. That, knowledge is relational and purposive in character.
4. That, knowledge is socially determined.
5. That, the growth of knowledge is adaptive and dialectical in character. And
6. That, the objectivity of knowledge is grounded in the 'intersubjectively' or publicly shared theoretical framework

Our contention that knowledge is theory-laden at all levels puts us against the empiricist tradition in epistemology. Similarly, our position conflicts with any version of a-historical idealism in general and absolutism in particular. For, they conceive of reality in monistic terms whereas a relational conception of knowledge such as the above necessarily implies a pluralistic world. Any attempt, therefore, to conceive reality as a 'block universe', to use William James' expression is, on our view, to negate

the possibility of knowledge itself. Implied in the above is also the rejection of the view which treats knowledge in terms of systems of concepts, abstracted from the problems and purposes to which they are historically related. Furthermore, our characterisation of the growth of knowledge as adaptive and dialectical is a radical departure from the neo empiricist and critical rationalist conceptions. And, finally, by adopting the dynamic character of knowledge as the epistemological centre of gravity we stand against apriorism of both classical as well as post-analytic, i.e. Descriptive Metaphysics, variety.

Peter Winch, in his Idea of A Social Science observes that "whereas special philosophies (of science, arts etc.) will have the duty of elucidating the individual nature of the 'forms of life' epistemology will try to elucidate what is involved in the notion of a form of life as such."[1] The features of knowledge listed above imply a certain form of life. Central to this form of life is the idea of human praxis, man's social-productive activity or Man's active struggle against Nature. That is to say, Man-Nature relation, in our view, is an inseparable dimension of human knowledge. The connection between praxis and knowledge is clearly manifested in the idea of causality, which, as has been shown,

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1. Routledge and Kegan Paul, London 1965, p.41.

earlier in Chapters 4 and 6, plays a preeminent role in perceptual and scientific knowledge. Meyerson rightly observes "Causalism...is a characteristic of man. Hertz saw this clearly when he declared that, "Every thinking person experiences herein difficulties which the scientist ordinarily qualifies as metaphysical" and when he drew from it this conclusion, "that no scruple which in any fashion whatever, has made an impression on our mind can be brushed aside by the fact that it is qualified as metaphysical.""[1] The important question here is to which aspect of human reality should we ascribe the origin of causal idea. Answer to this question largely depends on what one consider to be the nature of causal principle itself. Those who look upon "causality" as a "pre-scientific fetishism" naturally attribute it to the bygone stage of the development of human consciousness. Similarly, those who advocate associative view or regularity theory of causality find its origin in the mental trait of habit-formation. As indicated in Chapter 6 either of these interpretations of causality are unacceptable to us. In our view, "causality" is ineliminable and causal relation is a productive relation. As such its source can be found in nothing but the productive activity of Man himself.

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1. Identity and Reality, pp.364-5.

Once the connection between praxis and knowledge is properly comprehended, the problem of the objectivity of knowledge becomes amenable to a kind of solution different from what the grand theorists or the formalists have proposed. The objectivity of knowledge is grounded not in something 'pure' or 'trans-theoretical' but in intersubjectively shared theoretical framework, on the one hand and praxis as inter-subjectively or socially conceived on the other.

In refuting the view of scientific relativism, Kuhn draws a parallel between biological evolution and evolution of scientific knowledge.[1] Just as we do not need the idea of the highly evolved form of life in an absolute sense to judge Man as more evolved creature we do not need the idea of absolute truth to judge whether one scientific theory is better than the other. As Kuhn points out "if we can learn to substitute evolution - from - what - we - do - know for evolution-toward-what-we-wish-to-know a number of vexing problems may vanish in the process"[2] - the most major one among them being that of scientific relativism.

Cognitive relativism is a generalised version of scientific relativism. It thrives on the idea of absolute

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1. The Structure of Scientific Revolutions, pp.170-3.

2. Ibid, p.171.

objectivity and absolute truth. However, once we start looking at knowledge within the context of praxis and the different stages of knowledge as stages in Man's struggle with Nature, cognitive relativism loses its force completely. In fact, once we understand the historical origins of the subject-object distinction in the scheme of Man-Nature relation, the issues of relativism and subjectivism which thrive on the subject-object dichotomy vanish. The subject-object distinction originated along with the "It" conception of Nature. As a matter of fact, one is inconceivable without the other. The "It" conception of Nature or the subject-object distinction can be traced to a certain stage of development of human praxis, viz. the division of labour. "Division of labour only becomes truly such from the moment when a division of material and mental labour appears. From this moment onwards, consciousness *can* really flatter itself that it is something other than consciousness of existing practice, that it really represents something without representing something real: from now on consciousness is in a position to emancipate itself from the world and to proceed to the formation of "pure" theory."[1] The subject-object distinction engendered by the division of mental and manual labour is of such crucial importance that without

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1. Marx, K. and Engels F. *The German Ideology*, Progress Publishers, Moscow 1976.

it the scientific knowledge would not have been possible. In fact, as we have seen, what distinguishes mytho-poeic thought with its Thou conception of Nature from "naturalist" thought with its It-conception, is the absence of subject-object distinction in the former. But the autonomy of reason or consciousness engendered by the subject-object distinction turned the distinction into a dichotomy. Therefore, the subject-object dichotomy on which thrive the issues of subjectivism and relativism is the result of the estrangement of intellect from reality and the alienation of knowledge from praxis, in other words, of idealism. This estrangement and alienation can be eradicated only by realising the inseparability of knowledge from praxis. It is only then that "subjectivism and objectivism, spirutualism and materialism... lose their antithetical character...the resolution of the theoretical antitheses is only possible in a practical way.... Their resolution is therefore by no means merely a problem of understanding, but a real problem of life, which philosophy could not solve precisely because it conceived this problem as merely a theoretical one."[1]

The central point here is to recognise knowledge as a human activity, as a part and parcel of human struggle and as an activity determined by other aspects of human activities,

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1. Marx, K. Economic and Philosophical Manuscripts of 1844, Progress Publishers, Moscow 1974, p.96.

factors and forces that govern human society. The recognition of knowledge as inseparable from human struggle and, therefore, as a liberating force leads to the recognition of knowledge as a Value. Also, this recognition obligates philosophers to preoccupy themselves with the problem of identifying factors obstructing dissemination of this liberating force i.e. knowledge. It is this which would make philosophical enterprise a critical activity, directed against all forms of false consciousness ranging from brutalising superstitions to fetishism of commodities. In turning itself into a social criticism philosophy only lives up to its historical image - an image best reflected in the early Greek thinkers and, Lucretius, Bacon, Hobbes, the French materialists and Marx. The critical activity is both a product and harbinger of a human restoration to philosophy the necessity of which is expressed in the immortal words of Diderot:

> If Man...were banished from the face of the earth, the affecting and sublime spectacle of Nature would no longer be anything but a sad and silent scene; the universe would be stilled, silence and night would take over. It is the presence of Man, which gives significance to the existence of things. Can any better plan for the history of these things be proposed than to submit to this consideration? Why not introduce Man into our project, in the same way as he is placed in the universe?...Man is the unique point from which we must start and to which everything must be led back, if we wish to please, to inspire with interest, to evoke any feeling even in the most arid considerations and driest details.1

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1. Quoted in McRae, Robert. The Problem of the Unity of the Sciences: Bacon to Kant, Univ. of Toronto Press, 1961, pp.111-2.

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